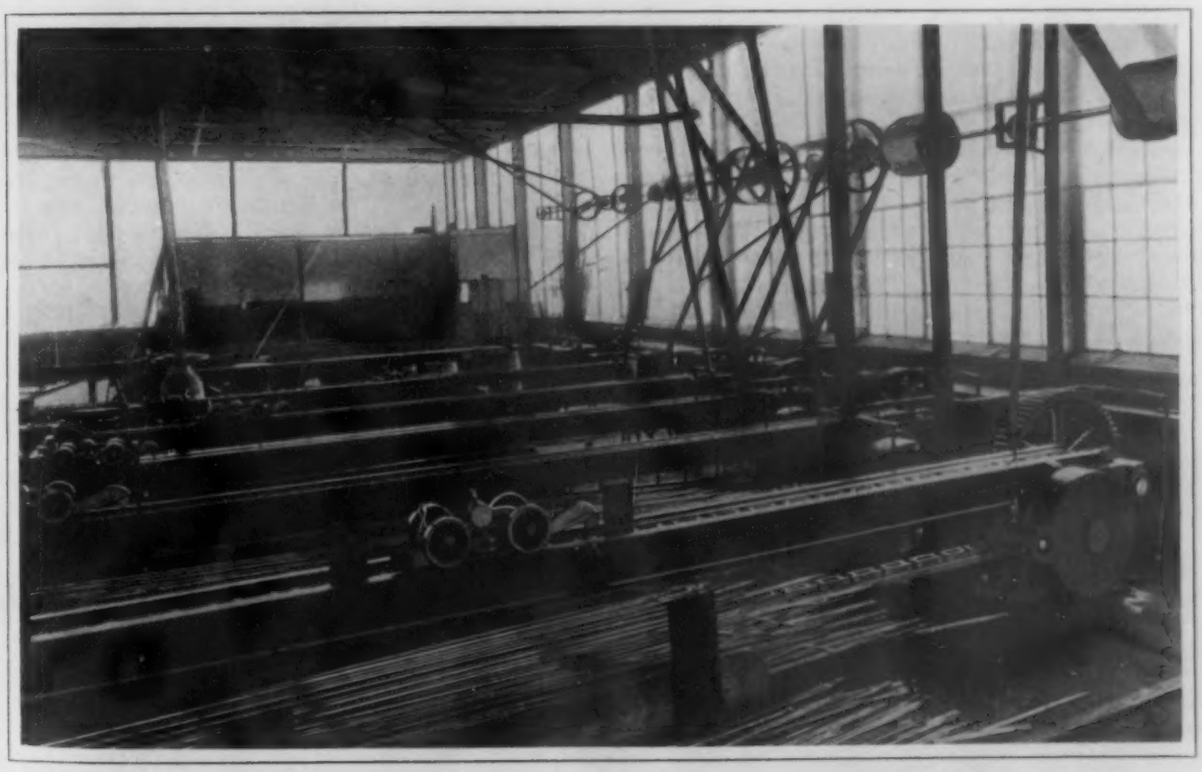
THE IRON AGE

Established 1855 New York, March 25, 1915 *Vol. 95 : No. 12*

Drawing Smaller Sizes of Brass Tubing

New Mill of the National Company, Waterbury, Conn.—Wood Burning Muffle Furnace—Details of an Interesting Process

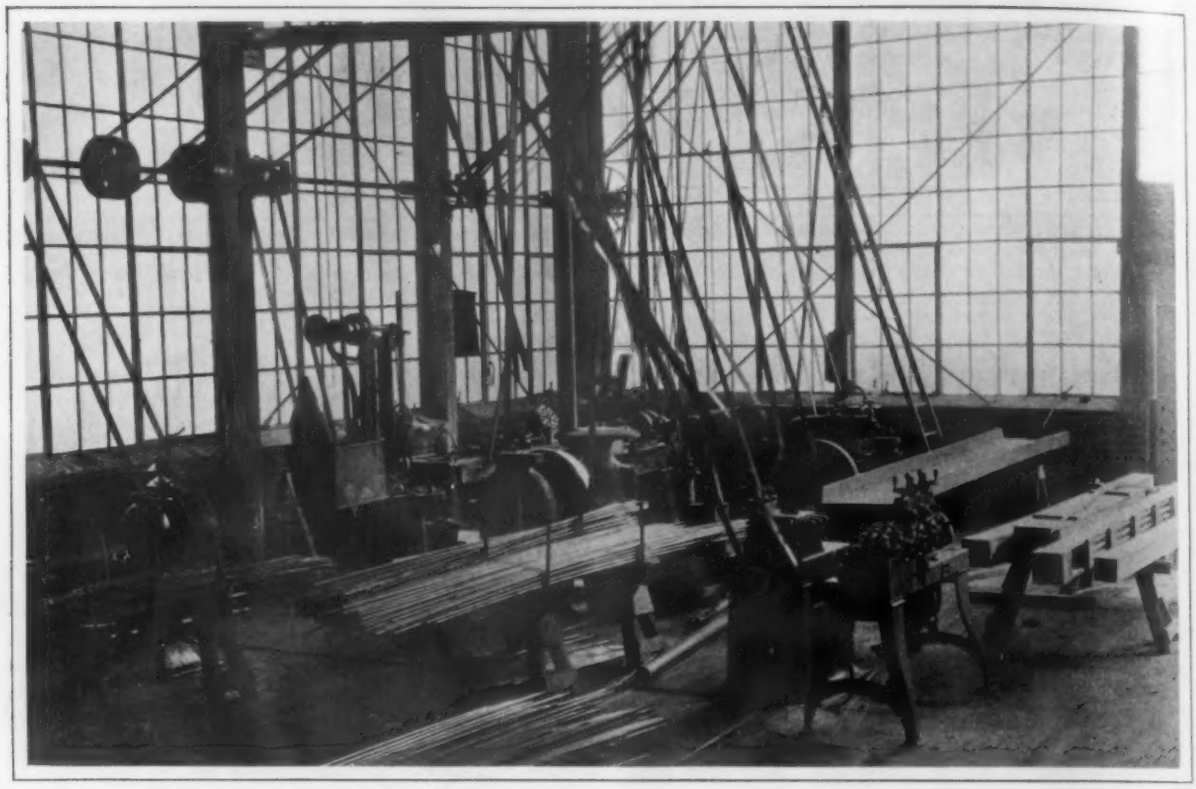
The manufacture of brass, copper and German silver tubing in the smaller sizes has come to be in recent years an industry by itself. The large mills have never cared for this branch of the business, but are glad to turn it over to those who make a specialty of it and have them as customers for the standard pipe sizes which constitute their raw material. As a consequence several small tube mills have been established in the Naugatuck Valley, in Connecticut, the center of the American brass industry, and in some other places where the finished material is cut up and worked into a multitude of purposes. The latest of these plants is that of the National Company, Waterbury, Conn., a recently established corporation. The mill is located about two miles from the center of the city, between it and the suburb of Oakville, on the line of the Watertown branch of the Naugatuck division of the New York, New Haven & Hartford Railroad. Its neighbor is the Waterbury Rolling Mills.



A General View Showing the Battery of Drawbenches, the Large Glass Area, the Office in the Corner, Which Is the Only Division of Space in the Plant and the Stock Trucks

The building is of modern construction, fireproof, of brick, steel and concrete. Ribbed glass windows, set in steel and concrete, occupy the greater part of the wall space. The structure is 70 x 100 ft. Its interior is one spacious, lofty room, the only subdivision of space being at one corner, where the office is partitioned off by corrugated iron walls and steel ceiling. No columns break up the area. The cement floor is covered by heavy plank and maple flooring, excepting in the vicinity of the muffle furnace, where brick is substituted.

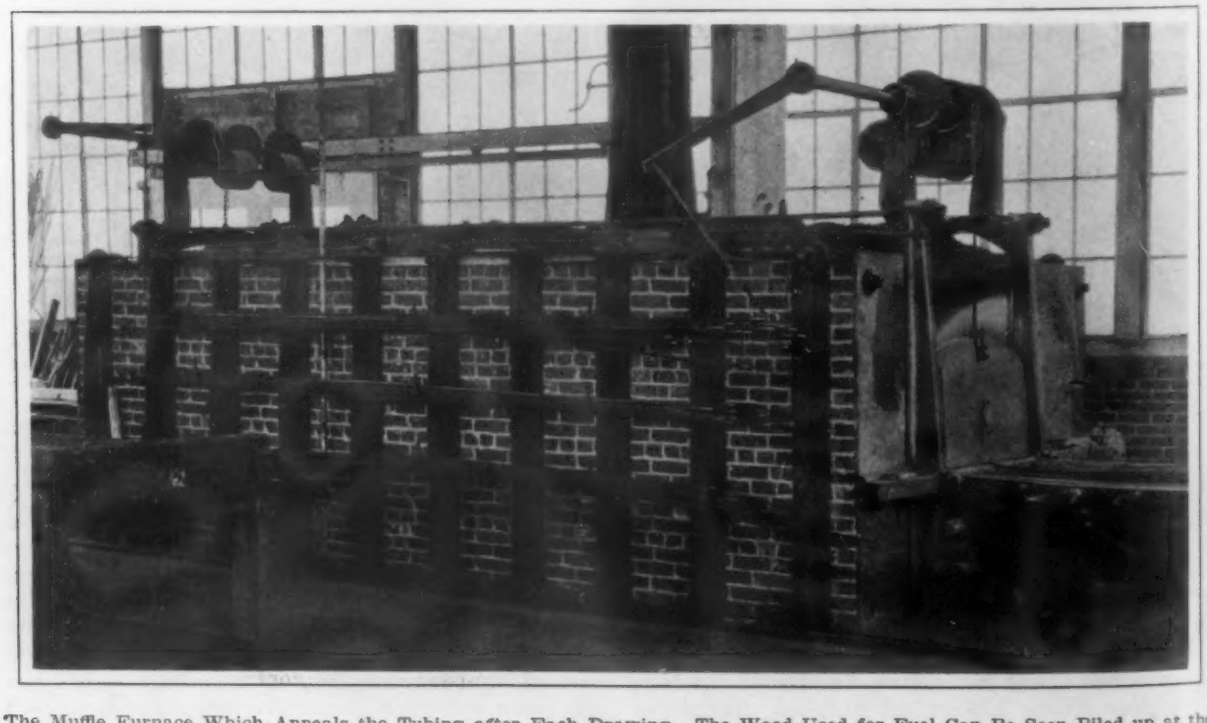
The equipment consists of drawbenches, a muffle furnace, swaging and straightening machines and cutting-off machines. The raw material commonly used is 2-in. tubing from the mills which, in their turn, are the company's customers for its scrap. Incidentally it may be stated that this is one of the reasons that no aluminum tubing is drawn in this plant, for where that metal is present in a tube mill, scrap possesses less value, because of



A Corner of the Shop, Showing the Swaging and Straightening Machines

the unfortunate results which follow the accidental addition of aluminum to a brass mixture.

From the original tubing the metal is drawn down step by step, the company's product having as limits 1¼ in. and No. 0. Sizes are by outside diameters, gauges by thickness of walls. The tube is annealed in the muffle furnace and swaged to permit the entrance of its end into the die of the drawbench and through it far enough so that it can be seized by the tongs. The die determines the outside diameter and the plug the inner diameter. The difference is the gauge. The plug is fixed to the end of a triblet, so-called, which is a rod long enough so that the plug can be thrust through the tube to the die end. The tongs, mounted on a carriage on the drawbench, are brought to the work by an operator and seize the swaged end. The hook of the tongs is dropped into the chain, which is running constantly, and the pull tightens the grip with the action of powerful toggle joints, the greater the power the stronger the grip. The tube passes through the die and over the plug. The difference in the two diameters may be large or small. In the case of some tubing used in automobile radiators the difference is so slight in the final drawings that a paper-like thinness results. For some other purposes the hole is very small as compared with the diameter. The small tubing busi-



The Muffle Furnace Which Anneals the Tubing after Each Drawing. The Wood Used for Fuel Can Be Seen Piled up at the Left

ness comprises a wide variety of specifications from its customers in these respects.

At the end of each drawing the tubing is given a fresh annealing and as it is extended it is sawed to lengths for convenient handling. Sections of the ends a few inches long are also cut off at intervals, because of a tendency, beyond control, to unevenness of form and gauge at their points. The tube must also go to a swaging machine before the next drawing. In the very small sizes no plug can be used in the final operations; the die determines both diameters. So the process goes on—annealing, swaging, drawing, cutting off—a few gauges at a time.

The muffle furnace was built from the company's own designs, but is of the standard wood burning type, with a firebox at each side and flues to give a complete circulation of the heat under as well as over the metal.

The drawbenches in the National Company's works are of the latest type developed by the Waterbury Farrel Foundry & Machine Company, Waterbury. The three sizes have pulling capacities respectively of 10,000, 20,000 and 30,000 lb. on the chain. The drive is compact and self-contained and includes an outboard bearing on the sprocket shaft, which serves to preserve the alignment of the main gears during the life of the machine. The main pinion is between the shaft bearings instead of being overhung. The wheeled tongs greatly reduce the fatigue of the operator and increase the speed of his return to the die end of the bench—which is a hand operation—as compared with the old type of sliding tongs. The chain and other parts of the bench have been strengthened and otherwise improved.

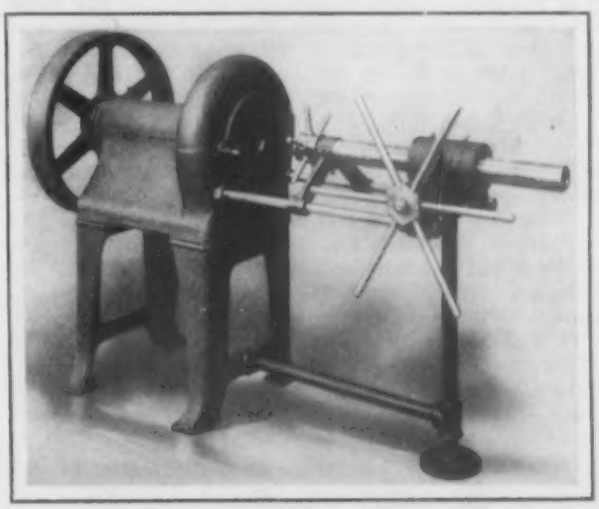
Direct Reading Time Study Watch

A time study watch is illustrated herewith, the dial of which shows the usual decimal divisions of the minute, and in addition displays figures which indicate the computed outputs per hour obtainable from single operations performed in the respective intervals of time marked by the corresponding graduations. Where the single operation occupies an interval too small to be easily observed, ten successive operations may be timed and the corresponding output per hour is the dial reading multiplied by ten. The watch also provides the "take out time" feature, the starting and stopping of the watch being controlled by the slide shown at the left of the stem while the "set back" is stem actuated. It is thus possible to read directly from the dial, without computation, the net output per hour on any job regardless of the number or duration of interruptions. The watch is being marketed by M. J. Silverberg, engineer, Peoples Gas Building, Chicago.

A New Time Study Watch

Feeding Attachment for Swaging Machine

For feeding long pieces of tubing or rod to a rotary swaging machine the Standard Machinery Company, Elmwood Station, Providence, R. I., has developed a special attachment. This will enable any particular portion of the bar, which may be of steel, brass, copper or iron, to be swaged; or if desired the size of the bar can be reduced throughout its entire length. Among the uses to which this attachment can be put in addition to the reduction of tubing are the swaging of special steel forms, such as trolley poles, automobile axles and other articles made from steel tubing. The attachment is made for use in connection with three sizes of the company's swaging machines, and in the accompanying illustration is shown attached to the No. 3 machine for handling stock up to a maximum diameter of 1¾ in. The other machines that can be supplied with attachments are the No. 4, handling stock 2¼ in. and smaller in diameter, and the No. 5, which accommodates stock having a maximum diameter of 4 in.



A Feeding-In Attachment That Has Recently Been Developed for Use in Connection with a Rotary Swaging Machine for Reducing the Entire Length of a Tube or Rod of Steel, Copper or Iron, or Swaging any Particular Portion

The attachment is bolted to the front of the machine and supported by a pipe stand. A bracket made from a steel casting is attached to the front portion of the spindle, and the two lower bushings on this bracket ride along the two rods that are bolted to the front of the machine. These are relied upon to serve as a guide for the spindle, as well as assisting to support it and keep it in alignment. The rear portion of the attachment consists of another steel casting which has a bronze bearing, in which the spindle rides. The large spanner wheel at the right feeds the spindle of the attachment in, while the wheel in the center of the illustration on the spindle operates over a spring collet, having a conical nose. The bar is put through from the rear of the spindle, which is shown at the extreme right, and is clamped tightly by the chuck on the opposite end of the spindle that is controlled by the spanner. The large spanner wheel controls the movement of the spindle through a pinion which meshes with teeth that are cut on the under side of the spindle.

Russia from the Point of View of an

An Illuminating Study Written for The Iron Age of Personal Association with Business Men and

CAPT. D. L. HOUGH

HARDLY anything has been written on Russia in the past few years that the printed title has not been followed by the qualifying phrase, "The Land of Great Possibilities." So vast are the possibilities that they arouse the interest of those looking to broaden their markets, to introduce their inventions or to investigate developable properties, and yet in America the question is asked, "Why is it none of the possibilities seem to materialize or to proceed even to the experimental stage?"

Russia is a long way off, hence, oftentimes matters up for discussion are dropped without even a visit to that country. Again those Americans who pay visits there rarely speak any other than their own language, and this makes it difficult for them to pursue their investigations without the employment of some guide, who being unfamiliar with their purposes or having some personal interest to promote will bring them in contact with people without the acquaintance or ability to help. This results in confusion and causes discouragement.

The man who goes to Russia to make investigations and allows for these but a week or two will get the views of but one man or one group and often will get quite a wrong understanding. The country is so tremendous and interests are so many and differ so widely that one can only obtain a thorough and rational understanding by devoting many months to the investigation. Having secured information in many directions, he must weigh it all and determine on his own procedure.

EXAMPLES OF AMERICAN SUCCESS IN RUSSIA

This may be said, however, that wherever Americans have actually undertaken to carry on the business of manufacturing or the development of properties in Russia and have failed, it has been because of bad management. There are several examples of this that need not be discussed; on the other hand, there are some notable examples of the success made by Americans in Russia and these may be cited.

The Singer Sewing Machine Company is probably doing more business in Russia than in many other countries put together. Its manufacturing plant near Moscow is a thoroughly up-to-date establishment.

The International Harvester Company has taken hold of the business in the right way and its success is well known.

The New York Life Insurance Company is doing a business that must be wholly satisfactory.

The typewriter makers, notably the Underwood, are doing a tremendous business and one of the most recent successes has been made by the Walk-Over Shoe Company.

EVER-IMPORTANT MATTER OF BUSINESS MANNERS

In all of the above cases the success is due to the abilities and also to the personality of the managers. Russia is a one-man country. Nowhere in the world has the personality of the leading man so much bearing on the success of a company as in Russia, for in Russia much consideration is given to one's attitude towards one's fellow man.

Brusqueness is quickly resented and the Russian does not permit himself, on the other hand, to be outdone in courtesy. It may be said that this is not a consideration that should be brought into a business discussion; perhaps because it was not explained why some undertakings have failed.

The Russian is human just as we are and likes criticism as little. Americans, particularly those who have not traveled extensively outside the limits of their own country, are often imbued with the idea that America is the only country on earth and that its methods and manners are those only worth considering. Knowing nothing of the origin of the customs, or the traditions that make them logical, they are unwilling to give time to their study, and it is often this lack of understanding of the way people have been brought up to think as much as lack of understanding of the language that causes them to depreciate the country they are visiting and to be a little too aggressive in "boosting" Yankee methods and manners.

Just as soon as criticism is started one might as well withdraw from Russia and for that matter from any other country. A Russian would waste his time attempting to reform America and the converse of this proposition is equally true.

SKEPTICISM OF AMERICAN SINCERITY EXPLAINED

There is another reason why things have not gone right. A man going over to Russia becomes enthusiastic about conditions. Seized with the absolute certainty of the success of some proposed venture, he gets carried away a little with his own confidence, and it is only to be expected that he will sometimes overstep in his assertions as to what he believes his supporters or his principals at home will do. He leaves the impression in Russia that great things will follow. When he gets home he finds that his principals or backers, not having been in Russia to see the promise of the situation and having other matters in their minds while he has but the one, are likely not to be stampeded into immediate action. The result is matters drag and very often are dropped.

This very thing having happened on various occasions has somewhat shaken the confidence of Russians in the sincerity of our countrymen.

The expression, "Acadia for Acadians" is a popular one in all countries. "Russia for Russians" is the war-cry of the Nationalist party of Russia, and it is one that is very popular with the people. This feeling is not confined to Russia, for we have a notable example of one of our most talented countrymen creating some excitement when he accepted an important post in England. Russians do not like to feel that their country is being exploited for the benefit of aliens, but they do not object to having aliens develop the country for the benefit of Russia or that such aliens receive a just reward. It is preferable, therefore, for the American to ally himself with Russians more in the spirit of adviser and co-operator than as an independent operator, if success is to follow.

WHY AN AMERICAN-RUSSIAN BANK IS NEEDED

Americans desiring to establish a business in Russia or to develop its resources should, wherever possible, be prepared to use their own money. One of the chief reasons why it would be profitable for Americans to establish a banking house in Russia is that while there are many banks and very large and active ones, the amount of money and the number of banks available are wholly inadequate to take care of the business offered. This fact has caused delay and sometimes has discouraged the Americans. The Russian bankers are so busy and have so many things presented to them that they have not the time to give them continued or, perhaps it would be better to say, sustained attention. The matter before their minds is the one that receives attention. If for any reason there is delay in making investigation or in putting the matter through the

American Engineer and Business Man

by Capt. David L. Hough, Who With Some Years Government Officials, Gives Little Understood Facts

regular channels, other matters come up and it is difficult to regain the attention of the bankers. The bankers cannot be blamed, for nearly everything presented is worthy of being undertaken, and the lack of time to take care of all of them results in many good things being shelved.

It is remarkable how little Americans know about Russia. It is the least visited of the European countries, although the number of tourists has been considerably increasing in recent years. In fact, over 200 self-called "refugees" assembled in the first days of the war in Petrograd, in order to be near and secure the protection of the embassy, and one may be pardoned for saying, here, that none of these people suffered any hardship whatever except those imposed upon themselves by themselves and such as were the fruits of their own imagination.

THE SMALL BUT GROWING MIDDLE CLASS

Russia lacks a great middle-class such as is the strength of all civilized countries, but its upper class is perhaps better instructed and in its social relations and in its customs is quite as exquisite if not more so than any other country; its court is the most stately in the world.

The great lower class might be compared to what the English call the masses. It is more rugged, healthier and far less vicious than that of any other country, and this is said without the possibility of contradiction. In the larger cities, however, a healthy middle-class is fast developing.

The lack of education among the masses may be in part responsible for the scarcity of material out of which skilled labor may be trained. In these days of automatic machinery, this is less of an obstacle in the development of manufactures; while for all physical labor of the common type, the Russian is equal to and perhaps better than any other race.

WHY THE DELAYS IN PLACING CONTRACTS

The government of Russia has been and largely is still of the parental type. Of the civilized nations it is more single headed than any other. It is not the intention in these studies to discuss the government or governmental matters and the reference is made here only to bring out a condition that has been remarked during the recent activities in connection with "war orders."

One man cannot do everything; all things but the most important must be delegated, but delegated in such a way that control is not lost, and Russia has worked this out rather well. Naturally this is most successfully done through the appointment of commissions so that the public welfare may not be subject to individual preference or the state of health of one man.

Russia is largely managed by committees, commissions and councils. There must be executive men who obtain and formulate information that is submitted to the commission, and, as is always the case, consideration must await the sitting of the committee and the action of this committee must be ratified usually by some higher council with fixed days of assembling and with a fixed programme before its each meeting. Reference is made to this not in a spirit of criticism, but in a spirit of explanation as to why it is that there is considerable delay after a price has been made upon some commodity before the order is placed.

It is quite natural that where there are several minds there should be several opinions and that in a meeting of a council called on to ratify the recommendation of a committee some member should conceive some expedient that to the other members of the council seems worth while. Hence, final disposition or the placing of the order is held up until this suggestion may be passed back to the committee, from the committee to the executive member and thence to the supply people. All this takes time. One grows accustomed to this after some experience in Russia and gets to believe that perhaps in the end the best result is obtained for the welfare of the people, in that every possibility has been canvassed.

We Americans, accustomed to do business quickly and who believe that it may be better to do something and get it done even if it be a little wrong, often chafe and grow impatient under these conditions, but Russia has existed a good many centuries and has built up wonderful cities and most highly developed manufacturing plants and transportation systems and has done it successfully with ever-accumulating wealth in this, their own way.

In our relations with Russia, we want to sell our products or our experience or our effort. There is little produced in Russia that we need, but there is much produced in America that we believe Russia needs and even Russia herself, perhaps, believes she needs. Anyway we want to sell to Russia, and it is an axiom too trite to repeat that the successful merchant is the one who puts on his counters what his customers want to buy; therefore, it would seem that if we want to have the markets of Russia open to us, we must try to accommodate ourselves not only to what that market demands and the way it wants it but to its way of doing business.

It was in accommodating itself to its customers' ways of doing business as well as to its customers' wants that Germany was conquering the world commercially, and that has made it so suicidal for her to attempt to conquer by force of arms.

FACING THE DOCTRINE "RUSSIA FOR RUSSIANS"

Returning for a moment to the doctrine, "Russia for Russians," one finds resolutions passed by many administrative bodies that nothing shall be purchased except it be made in Russia, if securable in Russia. Practically no concessions have been granted except with a clause to this effect, but the demand is so much greater than the local supply that much of material and manufactures has had to be purchased abroad and most of this has been purchased in Germany.

The writer has not before him the Russian Year-Book of the last year of record, 1912, and does not carry stastistics in mind, but the imports into Russia made direct have amounted to a considerable number of millions of dollars. The largest item in this has naturally been cotton, next to this agricultural machinery and following this machine tools, including not in small measure mining machinery; but there has been imported into Russia by way of Germany some two and one-half times as much as the direct importations from the United States. This has been due to the fact that the Germans were ready to pay cash on the documents in New York and to extend credit in Russia where their credit information is well developed.

THE PENDING RAILROAD EXTENSIONS

The works for the production of railway supplies are probably the best and most largely developed, but even these are inadequate. Last year the Government, proposing to limit the manufacture and sale of vodka, was turning to the development of facilities for storing and exporting grain—but this is a story in itself. As a

CAPTAIN HOUGH, as engineer and contractor, built tunnels in New York for the Pennsylvania Railroad and the New York subway system, as told in a notable interview in *The Iron Age*, March 18. He is now soon to return to similar activities in Russia, and in addition is representing some important American manufacturers in that country.

part of this, however, they were extending their railways. The programme for extensions and new constructions, necessitating additional equipment, was such that in spite of great opposition it had been practically determined before the war that a certain number of locomotives at least would be purchased abroad, provided they could be purchased upon suitable terms; and they wanted some examples of American make. At this time, Western Europe and American railroad supply people were urged to establish plants in Russia and this is really the best way for Americans to take advantage of the prospective business.

To profit by its argicultural activities its transportation facilities must be adequate, and this means activities in all sorts of lines. The peasants of Russia are particularly fitted for agricultural pursuits. The advances made have been marvelous, not only since the freeing of the serfs, about 1850, but since 1905, when the Government purchased the land from the princely

American visitors without knowledge of the language get wrong impressions.

American principals with numerous problems do not absorb enthusiasm of representatives.

American business will not prosper if not undertaken to bolster Russian enterprise.

American banking has an opportunity because Russian facilities cannot cope with demand.

American machine tool factories ought to locate plants in Russia, as home products are bought first.

American manufacturers ought at least have Russian sales offices or a technical trading company as sole agent.

holders on an installment basis and in turn sold it to the peasants on the same plan, leading the peasant to take an interest in his dwelling place and in his land. Under the previous communal system he drew lots for his home and his land once in ten years and there was little incentive for investment in betterments.

This same development is going to demand an increase in the merchant marine. One, of course, cannot say as yet, no matter what one hopes, what the effect of the present war in limiting marine armament may be, but one thing is certain, that there is to be great necessity for, with resulting activity in the construction of, merchant vessels in Russia.

CHANCE FOR MACHINE TOOL PLANTS IN RUSSIA

There are practically no machine tool makers and only one pneumatic tool making concern in Russia. Those concerns that establish plants in Russia will naturally receive the surplus business before it is purchased abroad. The reasons for this are too obvious to need mention, but it may be interesting to say that in a recent investigation made by the writer of the costs of manufacturing certain equipment in Russia which he had the opportunity to compare to the costs of manufacture of the same product in the best mills of America, he found a remarkable equality; in fact, the cost of production of a unit in Russia was often less than 5 per cent. different from the cost of producing that unit in America, and the Russians have not the labor-saving machinery that is in use in America. This means that with an American plant at the lower cost of Russian labor the American type of works could easily meet competition. Another interesting item was that the profit added by the Russians was considerably higher than that expected by the American manufacturer.

When equipment is to be purchased by a private railroad the costs of transportation and duty practically prohibit importation. However, in case of an equipment famine and an immediate necessity, such as one might rightly imagine will exist at the close of the war (during which much equipment has been destroyed and worn out by use when there was no opportunity for repair), it is probable that some temporary concessions in duty will be made. Naturally no one is going to consider for a moment the establishment of works in Russia while the war continues, but there could be no more profitable employment of capital than the establishment of works in Russia. It must be understood that a certain number of leading men and a certain number of operatives for instruction and pace setting purposes must be brought to the works from America to form the nucleus of the organization.

Prior to the war it would have been possible for any enterprising American concern desiring to establish a plant in Russia to secure perhaps half of its capital there. It is possible that after the war it may be necessary for the countries engaged therein to use all their capital for reconstruction purposes; therefore, one should contemplate furnishing the entire capital one's self.

It is important that the undertaking be made Russian and to this end there should be associated with it enough Russian directors to give it an appropriate complexion. Anyone proposing to follow out this plan would be received with open arms and given every consideration and support by the Government.

WHY AMERICAN MACHINERY WILL BE BOUGHT

It will take perhaps a year to construct a plant and to transport and install equipment and perhaps it will take another year to instruct workmen to bring such a plant to normal efficiency. During the period directly after the war it will doubtless be impossible to await the passing of these years and much of American production of every sort must be purchased because of the fact that other countries, excepting England, will be busy themselves reconstructing and England will be helping those other countries as well as Russia to reconstruct.

There is no question whatever that Germany will be shut out of Russia for some years to come. How many largely depends on what Germany does. With her enterprise, her readiness to meet the conditions of her market, it is quite probable that in due time it will become a matter of expediency rather than of resentment and the Germans will re-enter the market. This is one reason why America should act quickly in preparing herself to take advantage of the next few years to ship its home products and at the same time to establish its works and consequent good will so as to forestall the necessity or the possibility of having to meet German competition.

RUSSIA NOT A GREAT MINING COUNTRY

A word about Russia in general. Much time and large expense has been devoted to the investigation of its mineral possibilities. Russia is not, primarily, a mineral country. Such ore bodies as are now being exploited are low grade properties. There are some notable examples of great successes such as the Kishtim and the Lena gold fields, and a new property down in the Altai district has just been opened that gives promise of being at least equal to the other two.

There is coal in large quantities in the Donetz basin. This coal is as yet hardly touched. There is coal also in Siberia. In the vicinity of Irkutsk there are twelve small mines. These are not being operated with full satisfaction because of excessive competition. There is an opportunity for a combination of these mines, reducing costs of production and eliminating the murderous competition, but this is a thing that ought to be handled by the Russians themselves and probably will be some day.

There is iron in Siberia and in the Ural Mountains and elsewhere, but Russia is not and never will be a great mining country. For this reason its chief activity may not be manufacturing as it is in Germany. But Russia is the greatest agricultural country in the world,

and when one says Russia one, of course, includes Siberia, where the most fertile of virgin soil has never been scratched. While we have it in our minds as a frozen country, it is really quite similar to the Canadian provinces of Alberta and Saskatchewan, with the possibility that it is even more fertile.

THE GIVING OF CREDITS

In an earlier paragraph the subject of credit has been touched upon; Russians are accustomed to receiving credit from their own producers and from other countries, particularly Germany. The whole structure of business is built up on credit. If it were possible to pass a law that would affect the whole world, as the law restricting the sale of vodka became effective in Russia, and this law called upon all to pay cash at the point of production, it is possible, but only possible, that business might go on with equal facility and far greater satisfaction; but it is a part of competition to give credit. It is also just possible that the latitude of business would otherwise be materially restricted. Many able, enterprising concerns are now doing a good business in distributing the product of a manufacturer who has not the capital to do business except on a credit basis. Anyway, this great change is not going to take place, and if the United States wants to get into the Russian market it will be expedient to arrange some way to give credit.

The writer has on one or two occasions been criticised for advocating that the American manufacturer give credit and has been told that he would make himself unpopular and possibly be charged with being a little too enthusiastic if he preached this doctrine while in this country. But Americans give credit in their own country, why should they not abroad? The answer comes promptly, "What standing have we in foreign courts?" Times are changing; not long ago a Yankee would have had a poor show in Dixieland. The writer has heard of a few occasions when Americans have not been treated well in Russia and he has with such care as possible invesigated these incidents. He has found in every case that there has been something for which the American could be held responsible.

It goes back to the statement that the writer has often made that one lives and travels in Russia with greater security, with less annoyance and with more painstaking care for his comfort than in any other country of the world so long as he does not set things in motion or arouse suspicion by breaking some rule. He has lived in Russia for the greater part of the last four years and has never had the slightest annoyance of any kind whatever. This was because he has been careful to fulfill all the regulations. He was there, however, in 1895 and neglected to have his passport viséd to leave the country. With a companion he tried to plead his way across the border but it was of no use; he was subjected to considerable inconvenience and held under guard until the officer who should have viséd his passport was communicated with; and when what he should have had done was done, he was with the greatest courtesy speeded on his way. So it is always.

Merchandise, perhaps manufactures, of generally good character have been found to have some fault; and when once the machinery is set in motion in a country where the procedure is that outlined above, there are bound to be delays, and the American struggling to make things move faster sometimes makes them move slower.

The Russian character is amiable and honest; one meets with no more craftiness in Russia than he does in other countries. The writer has been actively engaged in business in Russia for four years and has had but two unfortunate experiences and in both cases it was a man carrying an American passport that imposed the misfortune.

The representative of one of America's largest industrial establishments makes the statement that his losses doing a credit business in Russia for the last twenty years have been less than 2 per cent., and it is doubtful whether there are any manufacturers in America who use so small a percentage in figuring their costs to cover bad debts.

Naturally, there are bad men in Russia as there are in America and one must investigate the purchaser who asks credit, and, therefore, America should have in Russia a credit concern whose complexion is American and whose loyalty to Americans will be unquestioned. An American-Russian bank is the solution.

THE MATTER OF WAR ORDERS

Throughout the above the rational legitimate business that is coming after the war has been in mind. It would be light-minded to consider for one moment the taking of what are known as "war orders" except upon a cash basis and for dollars paid in America. At the present moment there is no established rate of exchange between the ruble and the dollar. No private concern or bank can establish a rate of exchange at times when the balance of trade is disturbed. This must be done empirically by the Russian Government itself, as on those purchases already made.

Russian protection comprehends no buying if needs can be met at home.

Russian railroad and ship building will take American products because home supply will long be inadequate.

Russian purchasing is through commissions, which have worked well, even if slow in decision.

Russian labor, rugged and healthy, is available for the automatic machinery of modern manufacturing.

Russian business is based on credit and this has proved no risk in cases of American producers.

Russian boycott on American goods does not exist, but treaty questions may be left alone.

In some ways war orders are unattractive. Naturally, they involve large sums with commensurate profits and commissions, but under the present procedure, which is more or less of an outgrowth of unusual conditions, perhaps not altogether understood, the securing of a war order is wholly a matter of fortuity; the right man being at the right spot at the right moment with the right price and the right material.

One can well understand that any government with the vital interests that are now at stake would not wish to be laid open to the criticism of showing favoritism or of being influenced. Therefore, anyone who asks for a memorandum of requirements and specifications is naturally given them. This means that a multitude of people have the same inquiry. This inquiry is shopped around broadcast and producers may naturally believe that the aggregate of the inquiries is the measure of demand rather than that the amount of the individual inquiry is the total of the demand. As a consequence, a fictitious demand beyond the supply seeming to have been created, prices have gone up. Prices are given to each inquirer with the result that these self-appointed middle-men are in competition with one another, bewildering the purchaser and forcing him to sift them out, feeling, as he naturally does, that lower prices than those quoted can be obtained.

To avoid competing against one's self, the producer should confine prices to one inquirer and refer all others to that one. The difficulty is to determine to which one shall be given the price. Each self-appointed middleman feels that he is the elected one and in his enthusiasm very naturally exaggerates a little, which in the beginning causes confusion and in the end distrust of all. To correct this trouble the War Office in England has issued a proclamation that it will treat only with those who present unquestionable credentials that they are the sole authorized representative of the manufac-

turer. There are reasons perhaps why this can be done in England with less suspicion attaching to the officials than in some other countries. This is said positively; today there is as little ground for suspicion in the country under discussion as in any other country.

The president of one of the largest corporations in America, realizing the situation, is now sending his own men, one to each of the countries at war. He can well afford to do this because his prospective business is large. There are others for whom proportionately an equal percentage of business is in prospect in Russia who might not feel like going to the expense of sending a man. This is not necessary, but they should select some local representative and confine their quotations to him only. There is certainly more than one reputable, trustworthy and capable agency concern in Russia.

IN TIMES OF WAR, PREPARE FOR PEACE

While it is true war orders are not attractive except in their possibilities of earnings, which make it worth while to spend some time on them, now is the time to prepare for the business after the war. The old adage may be reversed; in this case being made to read, "In times of war, prepare for peace."

To sum up the situation, the writer's first recommendation to American business men is to establish plants in Russia. A noteworthy incident of this sort may be told. A skilled mechanic was sent to Petrograd to put into operation a plant manufactured by an American concern. Though a skilled mechanic, the man had organization and financial sense. He saw the opportunities in Russia and got the people for whom he was working to introduce him to a banker. This banker agreed to lend him the money to put up a small plant. He started this ten years ago and it has grown to such proportions that from his half interest in this undertaking last year he paid his living expenses and laid away $46,000, and for the last three years his original employer in America has been using every effort to try to secure the control of the Russian plant.

The second recommendation is that where the business prospect does not justify the establishment of a plant, some sales organization should be established, which must have also the ability to follow up the installation and operation of the product sold so that satisfaction may be assured.

The third recommendation is that neither of the foregoing being justified, then some technical trading company should be appointed as agent, to be treated fairly by the refusal to quote to any other concern.

TREATY RELATIONS

It may not be improper to refer briefly to the treaty relations between Russia and America. The question is often asked, "What is the feeling in Russia toward America?" At the time of the abrogation of the treaty, serious resentment was felt. In time, however, it began to be understood just why the treaty was abrogated and what brought it about.

Doctor Von Egert, at one time a leader of the Nationalist party, a man who has traveled much in America, is fond of Americans and admires the country, gave his attention to the study of the circumstances with the thoroughness and pains that are characteristic of the Russian. As a result, he issued a brochure based upon official documents and newspaper editorials, not news stories. This helped the Russians to a better understanding and it is interesting to note that it is felt that President Taft's action avoided an embarrassing possibility in the most tactful way and that Mr. Taft is held in high esteem.

The Russian mind does not harbor ill feeling; while perhaps quickly resentful, resentment wears down. It is felt that a discourtesy was shown Russia and a mistake was made in abrogating the treaty, which bore one clause which was in the treaty with no other country, and which perhaps we will never again secure, one that the diplomatic representatives of other countries had been trying for years to get.

Our trade relations are precisely those that existed before the treaty was abrogated. That they are such is due to the good nature of Russian officials and to no small extent because of the fitting diplomacy exhibited by our Ambassador resident in Petrograd during the period when the "modus vivendi" was arranged. Perhaps the term "modus vivendi" is wrongly used because no actual understanding has been agreed upon, but matters have been allowed to continue as far as trade is concerned precisely as they existed under the treaty.

There is no boycott on American goods. The Russian likes our manufactures. He considers the practical arts in America perhaps more highly developed than in any other country, and, like every other nation, they want to buy the best at the lowest price or where the balance of price and quality gives the best value. Where the Government is buying, the question is naturally asked, "Why should we buy from America when they have been 'rude' to us?" Government purchases have been and probably will be made in other countries wherever possible. This will be accentuated by their desire to show reciprocity to their allies, but when the advantage of buying in America justifies it, the Government will place orders here regardless of treaty conditions.

As a nation, they think we showed bad manners in the treaty matter, but they accept the individual American on his own qualifications. As an individual he is in the same position as the individual of any other nationality. They have grown to understand the circumstances surrounding the abrogation of the treaty, and any feeling that may have existed has become softened; in fact, the treaty abrogation is given little thought, and naturally less thought since the war began. It is a question whether it is necessary or even advisable to discuss a new treaty at this time unless it contains clauses whereunder the government may aid in credit extension, in which case the present is the psychological moment.

As far as the treatment of Americans in Russia is concerned or of Russians in America, a treaty would not benefit. Things are good enough as they are, and perhaps as soon as the question of a new treaty is taken up it might necessitate the discussion of troublesome topics.

Some day, no doubt, a treaty will be made. Perhaps this treaty will be made at the time the new treaties between all the countries must be arranged at the close of the war. These treaties, it is to be hoped, will contain some modern clauses that may largely eliminate the possibilities of war with its demoralization of commerce. They should contain others for the benefit of international business relations in arranging for some international tribunal, above the suggestion of bias, to which business men of one country may refer their misunderstandings with business men of another. The world is at present so closely knit together that some world Supreme Court is necessary. Nothing could perhaps so well inspire confidence, without which commerce proceeds haltingly. This might be the best foundation upon which to build up credit extension.

Status of Electric Smelting of Iron Ores

That the electric furnace has been successful in the smelting of iron ores in districts where the conditions are favorable, as shown by the fact that 10 furnaces of the Swedish type, with a total capacity of 22,000 kw, have been erected in Sweden, Norway and Switzerland, is the view of Dorsey A. Lyon and Robert M. Keeney in Bulletin 77 of the Bureau of Mines, "The Electric Furnace in Metallurgical Work." In the United States one iron plant of two electric furnaces with a total capacity of 5000 kw is in operation at Heroult, Cal. The type of furnace used in California is different from that used in Sweden, owing to the fact that a different grade of iron is desired. In Sweden a metal is produced that is low in silicon and carbon and particularly well suited to steel making, whereas in California the demand is for a soft gray foundry iron. The advantages of the Swedish metal are said to be:

Convertible into steel with greater facility and lower cost.

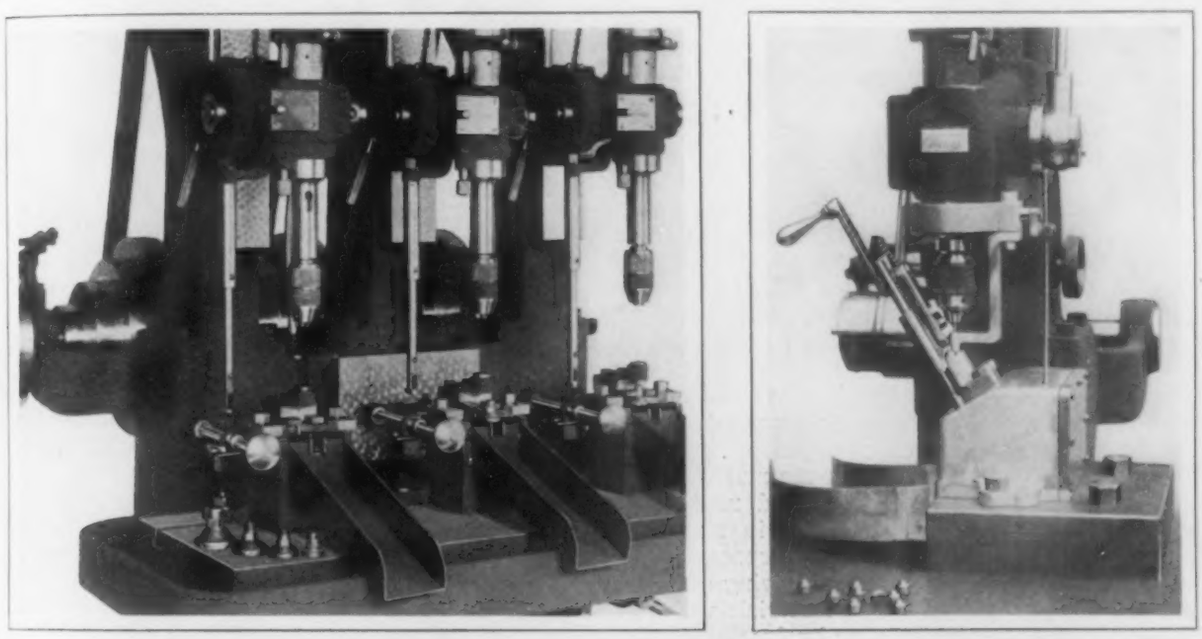
Greater economy in power consumption and in reducing material.

Carbon content can be controlled within a limit of 2.20 per cent. maximum.

Losses in the slag will not exceed reasonable limits. 6 per cent. FeO.

Attachment for Drilling Small Pieces

For producing small pieces rapidly in an upright drilling machine the Cincinnati Pulley Machinery Company, Covington, Ky., has brought out two special fixtures. One of these is intended for the production of malleable iron grease cup bodies at the rate of 12,000 pieces per 10-hr. day, while the other is used for drilling the brass timing fuse plugs for shrapnel cases. In the fuse plugs three No. 55 holes, which are 0.052 in. in diameter, are equally spaced around the dome of the plug at an angle with the center line, which brings the holes almost together on the inside. It is pointed out that for this reason only one hole can be drilled at a time and the purchaser of the machine, which is of the builder's regular No. ½ Avey column type with a foot treadle, specified a minimum production of 7000 plugs in 10 hr. with one spindle. In a shop test of the fixture it was found that the minimum requirement would be exceeded by from 2000 to 3000 pieces per day.



Two Views of a Recently Developed Drilling Machine Attachment. The One at the Left Shows It in Use on a Multiple-Spindle Machine for Drilling Malleable Iron Grease Cup Bodies, While the Other Illustrates the Application of It to the Production of Timing Fuse Plugs for Shrapnel Cases Having Three Holes Drilled at an Angle in a Single-Spindle Machine

In the production of grease cup bodies the movements of the spindle are entirely automatic and all that is required of the operator is to keep the jigs loaded. As the spindles return after drilling, the fixtures unload themselves, and several sizes of the pieces for which the fixtures were designed can be seen on the table of the machine. The holes drilled vary from ⅛ to ¼ in. in diameter and are approximately ½ to ¾ in. deep. In using the fixture the spindle feed and the length of stroke are set to get as many strokes per minute as the character of the work will permit. In this particular case the spindle will drill one piece every 8 sec. and the three spindles operate alternately. When the spindle has returned after drilling, the operator pushes back the rod having the large knob, shown to the left of the fixture, with his left hand and with his right places a piece in the fixture to be drilled. This rod is the ejector mechanism and is kept in a depressed position by a latch. The spindle comes down and drills the work, and as it returns the long vertical rod releases the ejector latch, the ejector coming forward and throwing the drilled piece out into the chute, which carries it off the table. The pieces are supported on two strips set on edge, are centered by the round base with a V-shaped piece and prevented from turning by the hexagonal part slid between the guides. The body of the fixture is a hollow box open at the back, thus permitting all the chips to fall inside and be washed to the rear of the table, lubricant being applied for the drilling operation. The work holding part of the fixture can be changed to accommodate different sizes of pieces.

A connection between the spindle sleeve and the fixture used for the timing fuse plugs operates the spacing or indexing mechanism to revolve the work automatically one-third of a revolution each time the spindle returns. When all the holes have been drilled the operator presses the lever at the left, which raises the holding-on spindle and brings out an ejector from the body of the fixture, thus unloading the work. As soon as the work is thrown off, the ejector returns before the holding-on spindle is lowered. After the pieces have been discharged they fall into the chute and are carried off to the rear of the machine. The body of the fixture is made of aluminum and the operating mechanism is of hardened tool steel.

Cast Iron with Wrought Iron Added

Thomas Turner, in the Journal of the Society of Chemical Industry, gives the strength of cast iron with additional wrought scrap as follows:

With 100 parts of cast iron 10 parts of wrought iron increases the strength 2 per cent.
20 parts of wrought iron increases the strength 32 per cent.
30 parts of wrought iron increases the strength 60 per cent.
40 parts of wrought iron increases the strength but 33 per cent.

The maximum result is therefore produced with 30 per cent. wrought scrap.

Official denial is given, though it was scarcely required, to the fantastic report that the United States Steel Corporation had purchased large tracts of iron ore lands in Brazil, on which much of the ore ran 73 per cent. in metallic iron. The report went on to say that to save freight on the ore the corporation would smelt it in Brazil, using electric current generated from abundant water powers.

Carnegie Steel Company's Boston Warehouse

At Allston, Mass., for Storing, Handling and Cutting Up Steel—Special Attention Paid to Safety of Workmen

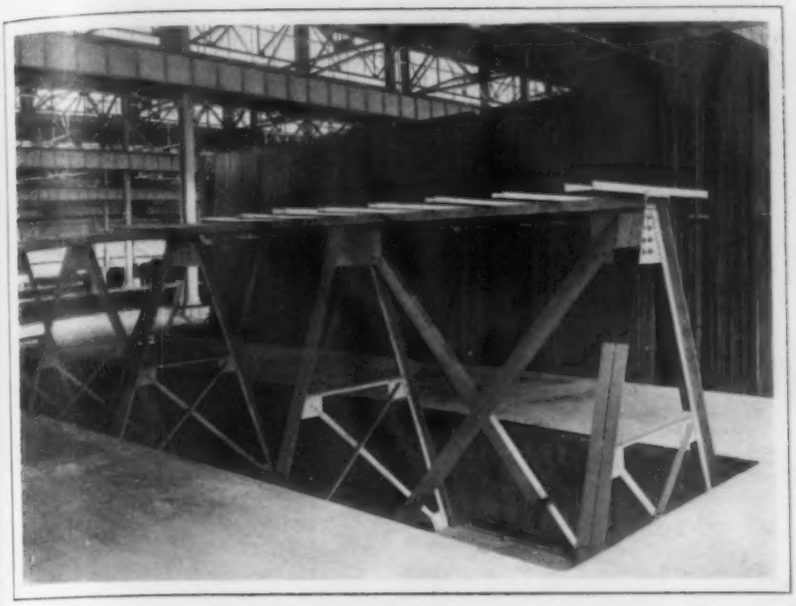
The Carnegie Steel Company has completed and is occupying its New England warehouse at Allston, Mass., a close suburb of Boston. The building, imposing in size, is on the main line of the Boston & Albany Railroad, from which it is served by a spur track. The storage capacity is 30,000 tons. Until now the company has supplied the wants of its New England customers from warehouses in the New York district, and the improvements in facilities which will result from the change are of considerable importance.

The Allston warehouse is 420 ft. long and has five 68-ft. bays, constituting a room of sweeping dimensions, as is apparent in the illustrations; architecturally the structure is impressive. The fire hazard is practically a negligible quantity, for there is nothing inflammable in the materials used in the construction. The walls and roof are of steel and concrete, with glass set in steel sash, which occupies a large percentage of space, not only in the walls, but in the monitors, giving a flood of sunlight. Needless to say the materials which are stored are not liable to damage by fire.

The warehouse is equipped for the most economical handling of materials. The bays run east and west, and two tracks from the railroad pass through their eastern end, facilities being provided for switching. The tracks are laid on Carnegie steel ties as rolled for standard railroad service. Each of four of the bays is served by a 10-ton double trolley electric traveling crane. Much of the space of the second bay is occupied by the racks for the storage of bars, and as this material is stacked by hand, no crane is required; the bars are delivered at points convenient for handling by the cranes of the adjacent bays. Material which is stored in piles is dropped by the cranes in its proper place. An industrial railroad constitutes an auxiliary, and passes over two 20-ton scales. Its buggies are of 30 tons capacity.

The bar storage racks conform to the Carnegie Steel Company's standard for warehouse use. There are 12 of them, built of structural steel and each set in a concrete pit. The section is an inverted V, 12 ft. in hight, with lateral spacers at the top. The pits are 4 ft. in depth, a dimension determined by

General View of Interior from the Crane Landing



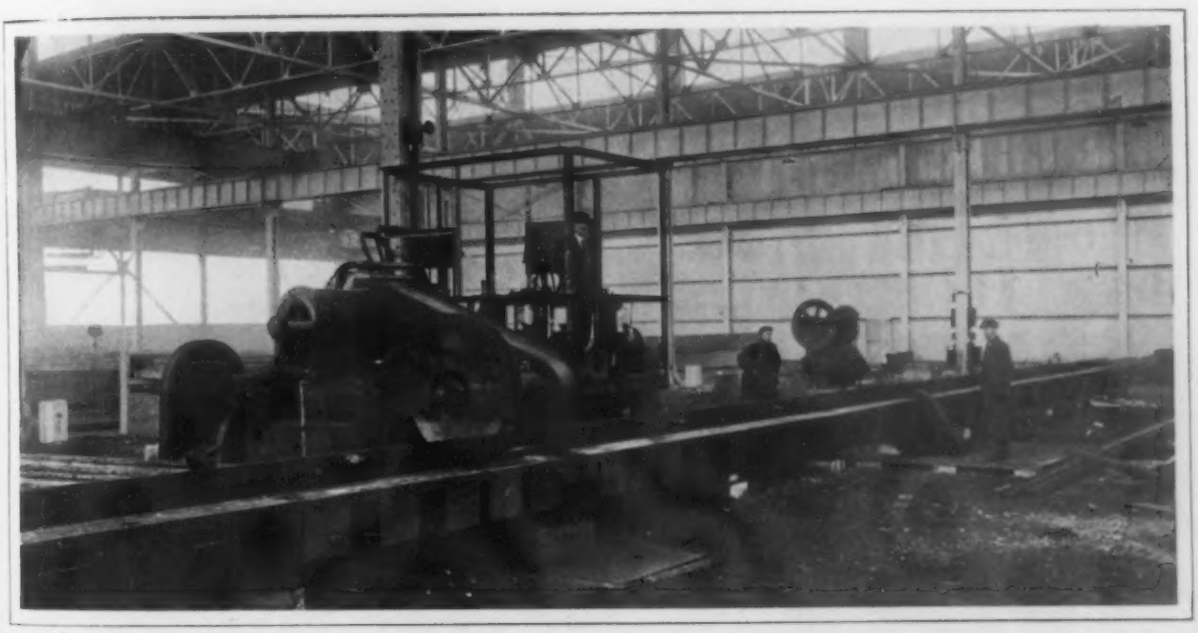
Details of the Bar Storage Racks

careful study. The result is a man handling a bar from the floor naturally seizes it close to the center, giving him the advantage of a balance.

The warehouse has machinery for cutting up material, and, within limits, for forming it, to meet the specifications of customers. A high-speed friction saw, built by the United Engineering & Foundry Company, takes care of rapid work, and a Newton cold saw cuts up steel where fine limits of accuracy are required. Other machines are a Hilles & Jones Company's double angle shear, United plate shear, the Cleveland Punch & Shear Mfg. Company's straightening machine, which is used not only in straightening material but in bending it to specification; a machine for twisting reinforcing bars for concrete, furnished by the United Engineering & Foundry Company; and a bar shear built by the Carnegie Steel Company. Each machine is operated by its individual electric motor. Power is purchased from a public service company.

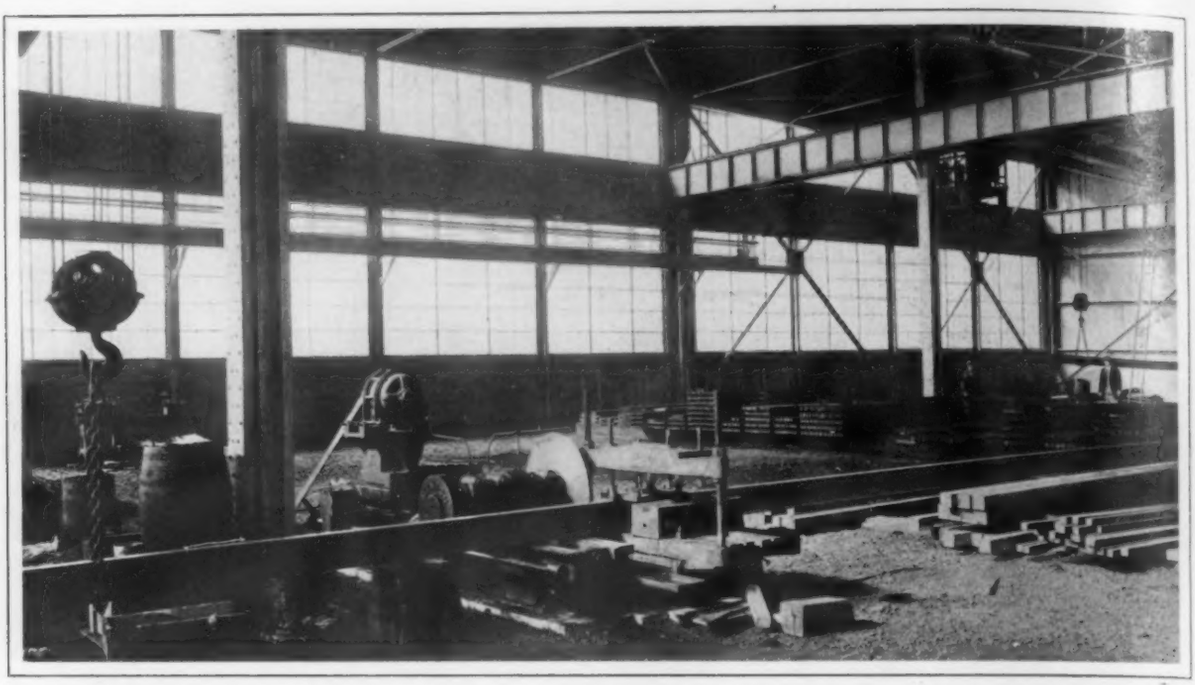
The element of safety has been developed to a high degree in the warehouse. In this connection an important feature is a walk or landing which extends most of the length of the west end of the building, on a level with the crane cages and is reached by a staircase from the floor. By this means the cranemen get to their cars without danger. In many plants they are compelled to undertake some risk as they make the ascent and descent. The stairs themselves possess an original feature which could be copied to advantage in many places. The treads are 8-in. channel irons, placed open side upward, and filled with concrete, which gives a good grip for the foot and prevents slipping. All gearing, and wherever possible all other working parts of machinery, are covered.

A works hospital will be es-



The High-Speed Friction Saw for Rapid Work

Details of the Channel Iron and Concrete Treads of Stairs to Crane Landing



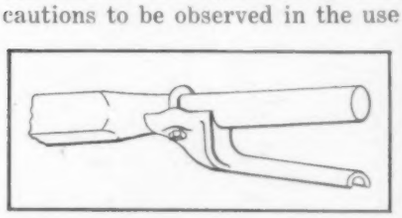
A Corner, with Crane Landing in Background, Showing the Storage of Rounds and the Coldsaw

tablished to render first aid treatment and to care for superficial injuries, following the system that the company has created for all of its plants. In addition to a certain number of more or less serious accidents which occur in the handling of heavy material such as steel, workmen in warehouses of this character are somewhat frequent victims of superficial cuts, which appear to be more than ordinarily liable to septic poisoning. Immediate treatment of such injuries reduces to a trifling percentage serious consequences, as experience has demonstrated.

A two-story office building will be erected in the spring, and also a building at the western end of the main structure, for the toilet and locker rooms of the workmen. The warehouse requires no heating; the men prefer that the temperature be determined by external atmospheric conditions.

Knuckle Guard for Wheelbarrow Handles

Safety Bulletin No. 21 of the National Founders' Association discusses at some length the precautions to be observed in the use of wheelbarrows and trucks in foundries. The careful selection of wheelbarrows for the work that they are to perform is urged. There is a right barrow for every task, and usually the right one is the safest to use. The practice of using coke barrows for transporting sand, cinders and coal, and coal barrows for moving castings is condemned. It is emphasized that consideration should also be given to the capacity of barrows, and the proper balancing of the load.



A Knuckle Guard for Use on Wheelbarrow Handles Designed to Provide Ample Space for the Hand and Allow It to be Removed Readily in Case of Accident

When barrows have to be wheeled through door openings or between piles of material and only a narrow passageway is available, the man's knuckles and wrists are likely to be bruised or cut by striking obstructions. The bulletin recommends that the handles of the barrows be equipped with knuckle guards similar to the one shown in the accompanying sketch. The guards can be purchased from barrow manufacturers or made in the foundry or from sheet metal. To enable the workman to remove his hand quickly and safely in the emergency, the guard is curved to give clearance between the handles and the guard.

Vertical Single-Acting Triplex Hydraulic Pump

To supply a small quantity of water under steady high pressure, the Hydraulic Press Mfg. Company, Mt. Gilead, Ohio, has brought out a vertical single-acting triplex hydraulic pump. It can be mounted on a truck and used as a portable pump for operating small hydraulic shop tools on which no pump is mounted, and an automatic knockout is provided to cut off the delivery of water to the press ram when the predetermined maximum pressure is reached. This attachment holds the pressure on the ram, and a slight drop automatically starts the flow, which continues until the maximum pressure is again reached. Twelve different sizes of plunger, ranging from 3-16 to 1 in. in diameter, can be used with the pump, the maximum pressure exerted ranging from 750 to 8000 lb. per sq. in. The plungers are of the same diameter and work to the same maximum pressure, each one having a travel of 35 ft. per min., at 150 strokes, which is the rated speed. The total capacity at this speed ranges from 0.41 to 4.20 gal. per min., depending on the plunger diameter. The over-all hight of the pump is 35 in., and the floor space measures 16 x 18 in. The pump is built for either gear, chain or belt drive, and without the motor base or belt shifter, weighs 500 lb.

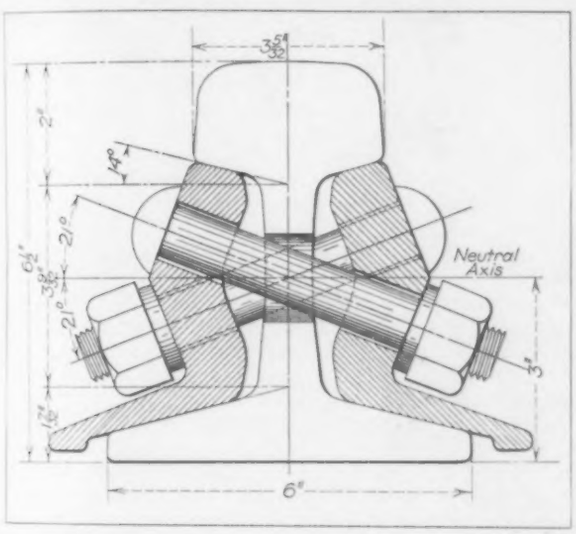
A New Diesel Engine Bulletin

To those who have under consideration the meeting of increased power requirements, a bulletin recently issued by the Busch-Sulzer Bros. Diesel Engine Company, St. Louis, Mo., will be of special interest. Referring particularly to the company's 4-cylinder, single-acting, 4-stroke-cycle type, this bulletin lays emphasis upon the manner in which reliability, accurate regulation of speed and economy of operation have been developed in the Diesel engine by reason of its design, its automatic controlling devices and the character of the manufacturing methods and facilities which have to do with its construction. The bulletin itself, by reason of typographical excellence, contributes in no small degree to the weight of argument presented.

A New Rail Fastening

The accompanying illustration shows the application of the Heinle truss fastening to a 135-lb. rail of the Central Railroad of New Jersey. It is claimed to be a more advantageous fastening for deep rail sections. It retains the nut and bolt as a fastening means and increases the capacity of the joint by merely giving the bolts a better position. The makers also claim that applying the strain above and below the horizontal axis of the splice bar eliminates horizontal wave deflection along the vertical leg of the bar, minimizes torsion and obviates inward vertical dishing; that additional metal carried in horizontal projections along the back of the bar is unnecessary, because the method of drawing the bars inward prevents vertical dishing.

It is pointed out that the contrary arrangement of the inclined bolts prevents any independent movement of the splice bars in a coupled pair. In other words, both bars move upward and downward in unison, due to the manner in which the stresses are transmitted between the bolt head and nut. Should one bar move upward the resistance set up between



The Heinle Truss Fastening for Rails of Deep Section Applied to a 135-Lb. Rail of the Central Railroad of New Jersey

the bolt head and nut causes the opposite bar to raise at the same time and vice versa in downward movement. Thus a uniform elastic wave through both bars is obtained; canting of the confronting rail ends is prevented and a continuous normal level at the rail ends is accomplished.

The truss fastening is claimed to assure uniform upward and downward stresses and to give the maximum stiffness without making the joint unwieldy, and the splice bars can be drawn inward over the flange with greater ease. Other points claimed are: Bars will not "kick out" at the bottom; there are no bolt holes at the center of the splice bar; great strength without sacrifice of elasticity; smaller bolts and bolt holes will suffice; bars weigh less per foot than other types, are easier rolled and are punched as usual from the back in a guide die; a bolt arrangement that will properly take care of the strains in the inevitable increasing depth of rail sections.

The new fastening is manufactured by the Heinle Company, Crafton, Pittsburgh, Pa.

Officers of the Lafayette Stamping & Enameling Company, Coshocton, Ohio, have been elected as follows: H. R. McCurdy, president; Edward LeRetilley, vice-president; P. E. Burt, secretary and general manager; A. T. Beall, treasurer.

A High Carbon 135-lb. Rail

The recent attention paid by some railroads to the use of heavier rails for certain purposes renders more important the results obtained by the Central Railroad of New Jersey from its use of the high-carbon 135-lb. rail. In *The Iron Age* of December 29, 1910, a description of this rail was published. It was adopted in August of that year by this railroad as a substitute for the more expensive manganese rail on curves where traffic was especially heavy.

Some facts regarding the use of this 135-lb. rail are now available. Since August, 1910, to the present time, about 5600 tons of these rails have been rolled by the Pennsylvania Steel Company; of these about 5300 tons have been or are now in use in Pennsylvania, where the road's traffic is heaviest.

The first rails rolled were ordered to contain from 0.90 to 1.05 per cent. carbon. Some of those obtained ran as high as 1.16 per cent. carbon. Later the limits were set at 0.90 to 1 per cent. carbon. In the four and one-half years in which these rails have been in service only 103 have had to be removed, amounting to about 76 tons. In no case were removals due to serious failures or accidents, but mostly to a breakage of the rail on the outside of the inner rail of the curve, practically on line with the side of the rail web. These fractures have occurred because of excessive pressure on that side of the head underneath the false flange of worn locomotive tires.

An illustration of this rail is incorporated in the description of Heinle truss fastening on this page of *The Iron Age* and in it many of the measurements are given. The following table, however, offers a comparison between it and the new 125-lb. rail of the Pennsylvania Railroad described in *The Iron Age* of March 11, 1915:

	P. R.R. 125-lb. rail	C. R.R. of N. J. 135-lb. rail
Weight per yard, lb.	123.8	135
Hight, in.	6½	6½
Width of base, in.	5½	6
Width of head, top, in.	3	....
Width of head, base, in.	3	3-5/32
Depth of head, in.	1¾	2
Depth of web, in.	3-13/32	3-9/32
Depth of base, in.	1-7/32	1-7/32
Thickness of web, middle, in.	21/32	¾
Radius of top of head, in.	12	14
Radius of top corners of head, in.	7/16	5/8
Radius of fillets, in.	½	½
Radius of sides of web, in.	16	14
Edge of base.	Vertical	Vertical
Fishing angles, top, deg.	18	14
Fishing angles, bottom, deg.	14	14
Area of head, per cent.	38.9	40.28
Area of web, per cent.	20.3	21.90
Area of base, per cent.	40.8	37.82
Moment of inertia.	68.7	72.39
Section modulus, head.	19.6	....
Section modulus, base.	22.9	....

Officials of the road express much satisfaction with the wear of this heavy rail and state that in no case has one broken in two.

Preventing Defects in Ingots

A new process for overcoming the defects in ingots due to piping has been patented (U. S. 1,119,088—December 1, 1914) by Alexander G. McKenna, Washington, D. C. The inventor proposes to fill the cavities or piping at the time of casting, and while the metal is still hot, with molten metal of substantially the same composition but of much higher temperature, so that the added metal will not only penetrate the interstices formed in the casting but will also melt down any obstructions and form a homogeneous mass by fusion. A portion of the original metal is tapped into a small portable electric furnace in the form of a ladle, having a bottom discharge, in which it is superheated and later poured into the cooling ingot.

Cost of a Government Armor Plate Plant

Estimates Given by the Congressional Committee, Some Called "Approximate"—Manufacturers Tender Advice

WASHINGTON, D. C., March 22, 1915.—To construct a Government armor factory having an annual capacity of 20,000 tons would cost $10,331,906, while a factory of 10,000 tons capacity would cost $6,635,107. These estimates represent the conclusions drawn by the joint Congressional committee which recently investigated the three private plants now engaged in producing armor for the Government and are embodied in an official report just made public here. Following is a summary of the cost of the proposed plants:

	10,000-ton capacity.	20,000-ton capacity.
Site, grading and clearing, fence	$28,000	$34,000
Office	53,750	74,000
Physical and chemical laboratory	46,875	71,062
Miscellaneous shops and buildings	169,397	247,636
Locomotive house and rolling stock	124,200	169,300
Boiler plant	285,000	457,000
Hydraulic system	35,500	55,000
Electric power house and transmission lines	216,600	351,525
Gas producer house	246,650	442,250
Coal storage and crushing plant	34,800	47,200
Open-hearth plant	682,950	1,057,800
Forging and bending shop	1,777,800	2,728,500
Cementing and tempering shop	1,105,800	1,912,500
Machine shop	1,224,594	1,744,869
Total (exclusive of land)	$6,031,916	$9,392,642
10 per cent. incidentals, engineering expenses, unforeseen contingencies	603,191	939,264
Grand total	$6,635,107	$10,331,906

ARMOR PLATE AT $230 PER TON

The committee estimates that the probable cost of armor made in the 20,000-ton Government plant, when operating at full capacity, will be $230.11 per ton, made up thus: Labor, per ton, $71.92; metal, per ton, $107.14; repairs and maintenance, $40.72; maintenance of plant, $10.33. The cost of producing armor in a 10,000-ton plant under like conditions is $262.79 per ton, which figure includes labor, $87.38; metal, $107.14; repairs and maintenance, $55; maintenance of plant, $13.27. The estimates submitted by the committee have been arrived at by a method which is described as follows:

(a) An estimate has been made of the probable number of employees required for plants of these sizes, with their daily or annual rates of pay. The national holidays, summer half holidays, and 15 days' annual leave due to each Government employee have been considered. With this in view the total annual pay roll has been computed, which has been divided between 20,000 tons and 10,000 tons of armor, which are to be the respective productions of the plants, giving the cost of labor per ton of armor in such plants. In this cost of labor per ton of armor is included the labor of repairs and maintenance, as the men who perform this work are included in the annual pay roll of the plants.

(b) The rates of pay have been obtained by ascertaining what men of similar rating receive at similar plants and by consulting the wage schedule of the navy yard, Washington.

(c) The metal per ton of plate has been obtained by taking the standard practice for making up a charge of nickel-chrome alloy and charging the price per ton which prevailed during 1913 for the material. The cost of metal per ton is the same for both plants. The furnace losses, pit scrap, rejected ingots, have been obtained from actual practice. The amount of finished plate produced from ingots at the forge has been obtained by actually ascertaining the respective weights of ingots at forge presented by one company and comparing it to the number of finished plates produced by that same company. In obtaining the cost of the metal in a ton of plate credit for pit scrap plates and ingots has been given at the same rate at which this material is charged into the furnace charge, the labor necessary for cutting this material up being already included in the pay roll.

(d) The item of maintenance and repairs per ton of armor has been obtained by estimate and is thought to be fairly accurate. The price of the coal used is the contract price for coal for the navy for 1915. The other estimates have been obtained by observation and investigation. The 2 per cent. of installation cost for upkeep of plant and buildings is for the extensive overhauls of furnaces and upkeep of the buildings and materials necessary to keep the plant in first-class condition, other than those small repairs which are necessary to keep in a going condition. This percentage is less than has ever been used in previous estimates, but is thought to be sufficient.

(e) By adding the four parts mentioned previously the total cost per ton of armor has been obtained, which is the production cost only. No allowance is made for depreciation, fire losses, or Navy Department administration.

A 20,000-TON PLANT THE BASIS

Estimates were first prepared for the 20,000-plant, the report states, and the 10,000-ton plant figures were patterned thereon. The price of the land necessary for the plant and certain other items are admitted to be so indefinite as to be only the roughest approximations. The location and local conditions will bear largely on the cost of the various buildings and the installation of the machinery therein. The committee calls attention to the fact that the Government now owns at Philadelphia Navy Yard ample land for the erection of an armor factory, and that, therefore, no land would have to be bought. Philadelphia is an ideal place for the erection of such a plant, it is stated, as it is accessible both by deep-water transportation and railroad facilities, is near coal and iron and has a good labor market. In addition, the navy yard has facilities for assisting in the construction of the proposed plant, which would largely reduce the expense of erecting it.

No estimate for the manufacture of any special treatment steel is made, except that required for the turret and conning tower tops. For the production of 20,000 tons of finished armor plate per year about 70,000 tons of ingots would have to be cast, and as the open-hearth plant would be shut down on Sundays and holidays there could be no casting on Saturdays, owing to the fact that no stripping would be permissible on Sundays, and the plant would be able to average only 250 days per year, which means that 280 tons of armor ingots would have to be cast each day. Each open-hearth furnace would be out of repair eight weeks per year, so that the five would have a total of 40 weeks of idleness. Thus an output of about 85 per cent. of the total capacity of five furnaces is reckoned upon. Considering the average weight of plate and the number of plates installed on each of the newest design of battleships, if this plant is to produce the armor for two battleships there will have to be presented for forging, cementing, reforging, treatment, hardening and bending two plates per day, and there must be completed in the machine shop an average of five plates every three days.

DEPARTMENTS OF THE PLANT

The principal buildings of the proposed plant are described in the report as follows:

Open-hearth Plant

In the open-hearth plant will be made all of the steel from which the armor is to be fabricated. The raw material used will be pig iron and scrap, with the necessary nickel, ferrochrome, ferromanganese, etc., required. The building will be one story, with a monitor in its center, the frame of the building to be of structural steel, which will be covered with galvanized steel. It will be fitted with crane runways, and will be constructed on such levels as to best accommodate the 5 open-hearth furnaces and the 10 accompanying gas producers. The charging floor in front of the open-hearth furnaces will be laid with tracks for two electric

charging machines and for the necessary charging bogies. In the rear of the furnaces, at a lower level, will be two casting pits in which the ingots will be cast. Estimates have been made for a heavy crane capable of handling the largest ingots and ladles used in connection with pouring the ingots.

No estimate has been made for the making of sand molds, as it is contemplated that only metal molds will be used, and they will be purchased from some manufacturer of high-grade castings, rather than manufactured in the plant. Estimates have been made for the necessary gas mains and coal and ash handling machinery in connection with the gas producers, these producers to be located in a lean-to attached to the building.

Forging and Bending Shop

The building will be a flat roof with monitor, fitted with the necessary crane runways. In this building will be located three 14,000-ton capacity presses capable of forging and bending the thickest and heaviest armor known or required.

In the armor plants of domestic manufacturers the forging and bending presses have heretofore been of the hydraulic type, the use of which type necessitates a very high-powered pumping engine. After consultation with the manufacturers of the steam intensifier type of forging press, the committee is informed by them that it is entirely practicable to use this type of press for the forging and bending of armor, and they state that such presses are used abroad, but none of them have been used in this country, and if it is found that they can be used satisfactorily they will be cheaper than the hydraulic press. This estimate contemplates the use of the steam intensifier type of press. Should the government decide to build an armor plant, this matter should be one for the most careful investigation by the engineers employed for the design and layout of the plant, and should it be decided that it would be safer to follow the design of presses used in existing armor plants in this country, these estimates would have to be increased by about $750,000 for the 20,000-ton plant and $500,000 for the 10,000-ton plant.

This shop will also contain ingot-heating and car-bottom plate-heating furnaces for the heating of ingots and plates preparatory to forging, reforging and bending. The gas producers required for these furnaces will be located in a lean-to on the cementing and tempering shop.

A very large number of dies and tools are required in this shop, which could not be given in the form of an itemized list in the estimate, but are lumped into one general item.

Cementing and Tempering Shop

This shop will be a one-story, flat-roof and monitor building, structural steel frame covered with galvanized steel, in which the armor plate will be carbonized and heat treated and finally water hardened. It will contain a large number of car-bottom plate-heating furnaces and water-hardening sprays, piping and reservoirs, required for tempering. In a lean-to will be located the necessary gas producers for this shop and for the forging and bending shop. Estimates are made for the gas producers. The location of the pumps to supply hydraulic pressure throughout the plant is contemplated as being in this building. This hydraulic pressure will be required for the withdrawal of car bottoms from furnaces, for the opening of the various furnace doors, operation of valves, etc.

Machine Shop

The machine shop will be a brick building, one story, flat roof, with the necessary crane runways. This building will be built in two spans and will be heated and well lighted, in order that machine-tool work may be done in comfort at all times. The shop will contain the machine tools for finishing armor plate, and will be supplied with cranes for its handling. There will also be the necessary surface plates for the erection of the armor before it leaves the shop. The estimate for this equipment was more accurately and readily prepared than for any other part of the plant, as the makers of the tools were consulted and actual estimates obtained.

In addition to the buildings described in detail, provision is also made for an electric power plant to be contained in a brick building having the necessary turbo-generators, piping, auxiliaries, switchboard, air compressors, etc.; a boiler plant with capacity for 20 large boilers; a locomotive house, blacksmith and carpenter shops; physical and chemical laboratories; tool and store houses, and a large office building to house the administrative officers.

MANUFACTURERS PROPERLY REFUSE TO GIVE THEIR COSTS

Accompanying the report of the committee is a transcript of the testimony taken at the plants of the Carnegie, Bethlehem and Midvale steel companies. The chief feature was the courteous refusal of the officers of these companies to furnish the Government with the details of the cost of producing armor in their respective establishments. Commenting upon this feature of the investigation the report says:

> The committee submitted a series of prepared questions to those officials of the various companies who were in a position to know the correct answers, and the questions submitted and the replies elucidated are herewith given. It will be seen from these replies that in general no information could be had from the armor-plate manufacturers which would tend to throw any light on the cost of their product. Where answers were refused the refusal was generally based on the plea that the answer would disclose business secrets which would be advantageous to their rivals at home and abroad. The committee does not believe that a frank disclosure of the costs would work any harm to any of the firms, so far as furnishing an advantage to their rivals is concerned.

Interesting testimony was brought out at the Midvale plant, where William P. Barba, manager of the company, told of the enormous expense incurred in fitting up of plant and preparing to bid on armor, all of which, he said, had to be considered in connection with any calculation of current costs. President E. G. Grace, of the Bethlehem Steel Company, told the committee that the Government would be able to buy its armor cheaper if it would follow the example of the governments of England and Germany, which ordered armor in large quantities for use ahead, thus permitting full capacity production, in spite of which the English government today is paying from $50 to $75 per ton more than the United States. Mr. Barba, Mr. Grace and Mr. Dinkey, president of the Carnegie Steel Company, denied that there was any combination among their companies with regard to the price of armor. Congress had fixed the price from time to time, they asserted, and all bids were based upon such price. W. L. C.

Iron Smelting in the Philippines

An account of an occurrence of iron ore in the province of Balacan, Island of Luzon, Philippine Islands, and of the special iron-smelting industry that has developed there is contained in the Philippine Journal of Science. The ores consist of magnetite and hematite which are smelted by the natives in small blast furnaces. The iron thus produced is cast direct into molds for the production of plowshares and plow-points.

The furnaces are built of soft clay bricks set in clay and cased with bamboos, and are about 7 ft. 6 in. high and 5 ft. in external diameter. The inner cavity is 5 ft. 9 in. deep and is conical, tapering from 40 in. at the top to 20 in. at the bottom. The furnace is fitted with a single clay tuyere and is blown with the usual Chinese double-acting hand-blower, made from a hollow tree trunk and fitted with a wooden piston packed with feathers. The blower is 11 ft. 6 in. long and 14 in. in diameter. The charge consists of ore and charcoal put in at intervals, an average charge being 55 lb. of ore and 95 lb. of charcoal, and no flux is used. Such a furnace produces about 5 cwt. of castings per day. The iron is a hard white iron, low in silicon, but containing a fair percentage of carbon. The yield of iron is only about 68 per cent. of that in the ore, the principal loss being due to prills of iron entangled in viscous slag.

The process is particularly interesting as detailed records of the production of cast iron in furnaces of such a primitive type are not numerous. The industry is very evidently Chinese in origin, owing little or nothing to European influences.

The Steel Sales Corporation, recently organized, has established an office and warehouse at Jefferson and Adams Streets, Chicago, for the sale of standard and special grades of finished iron and steel for shipment from mill or from Chicago stock. The company acts as direct mill representative for the sale of strip steel, flat wire, sheet steel, drill rods, Norway iron, spring steel, shafting, cold-drawn steel, etc. A. D. Dorman is president and treasurer; J. A. Roesch, Jr., vice-president; D. R. Hoffman, secretary, and F. W. Walters, general sales manager.

FREDERICK W. TAYLOR DEAD

The Father of Scientific Management and Co-Inventor of High-Speed Steel

Frederick Winslow Taylor, the father of scientific management and inventor with the late Maunsel White of the Taylor-White high-speed metal-cutting steels, died unexpectedly on March 21 at the Medico-Chirurgical Hospital, Philadelphia, after a few days illness with pneumonia. He was taken ill about a week previously at Atlantic City where he had been staying for some time on account of the ill-health of Mrs. Taylor. The day before his death was the fifty-ninth anniversary of his birth.

He was born in Germantown, Pa., in 1856. His primary education was obtained in this country, in France and in Germany. He was prepared at Phillips Exeter academy to enter Harvard. Perhaps fortunately for the best development of his natural talents, as he was about to enter college his eyesight became so much impaired that it became necessary for him to withdraw and change his educational plans. He returned home with the determination to secure an apprenticeship to the engineering trades until his general health and eyesight should be sufficiently improved to permit resumption of college studies.

FREDERICK WINSLOW TAYLOR

An opportunity offered to apprentice himself to a small pump works in Philadelphia which he accepted. Here, on account of his previous educational advantages, he made rapid progress and was permitted by his employers to make special arrangements for completing a journeyman's course both in pattern making and the machinist trade. He completed his four years apprenticeship in the dull period of 1878, and no opportunity offering to work at his trades, he accepted a position as laborer with the Midvale Steel Works. With this company his industry and ability were soon recognized and rewarded. He was appointed shop clerk and afterward placed in charge of the tool room. While in charge of the tool room his attention was drawn to the inefficient system and loss of time in allowing each man to grind his own tools. He received the approval of the company to designate one man for this duty, and not long afterward invented the Taylor grinder to accomplish the work more accurately and rapidly.

Having thus demonstrated his resources and abilities to meet emergencies, he was promoted from the position in the tool room through successive positions until six years from the time he started as a laborer he was chief engineer of the Midvale Steel Company. At this time his experience and work had been such as to make him appreciate and desire to know more about the underlying principles of the science of engineering, so in 1880 he began to study at night the engineering course as required by Stevens Institute of Technology and at the end of three years, in 1883, he obtained from Stevens the degree of mechanical engineer.

Mr. Taylor remained with the Midvale Steel Company until 1890, during which time he made many improvements in machinery and methods. In his passage through the shops he had studied the management and methods; he had developed his naturally keen powers of observation and his superior ability to analyze and draw deductions. As no definite data were available as to what a given mechanic should produce with a given tool and a given piece of work, he began systematic studies, with the cooperation of the shop men. As a result the shop output was increased 200 to 300 per cent. by an increase of pay of 25 to 100 per cent. to the workmen. Thus he laid the foundation of what later became his specialty "The development and application of the science of shop organization and management." In 1890 he left the Midvale Steel Company and became manager of the Manufacturing Investment Company, operating large paper mills in Maine, where he remained until his three-year contract expired.

He then began, as consulting engineer, to introduce his principles of organization and management into various establishments about the country. During this period and in connection with this work he made many valuable improvements and inventions, a large number of which he patented. In 1898 the Bethlehem Steel Company found that its forge shop output was much greater than the machine shop capacity to handle this output. It was estimated that a new machine shop of sufficient capacity to keep up with the forge shop would cost $1,000,000. Mr. Taylor's success in producing increased shop efficiencies at other plants led the company to retain him to work out the problem.

Among the experiments made to increase the machine shop efficiency of the Bethlehem Steel Company were those on tool steel in conjunction with the late Maunsel White, leading to the discovery of the Taylor-White process of heat treatment, increasing the cutting efficiency of tool steel 100 to 200 per cent. This process, and the tools treated by it, are used now in almost every machine shop in this country and also abroad. The essential qualities of all high-speed tool steels are as first made by Mr. Taylor and Mr. White. It has revolutionized machine shop practice and also caused changes in the machine shop industry. In the Bethlehem Steel Company's machine shop, where the discovery was made, the use of this steel and the improved shop methods of Mr. Taylor resulted in an increased production of 500 per cent. and instead of an increase in machining capacity an increase was necessary in the forge shop.

Mr. Taylor presented his system of shop management to The American Society of Mechanical Engineers in 1895 in a paper entitled "A Piece Rate System" and in 1903 in a paper on "Shop Management." He has also presented in his address as president of that Society, December, 1906, the valuable and exhaustive monograph entitled, "On the Art of Cutting Metals," covering twenty-six years' experience.

In 1906 the University of Pennsylvania conferred the degree of doctor of science upon Mr. Taylor, and in 1912, Hobart College made him a doctor of laws. The Paris Exposition of 1900 presented him a gold medal for his participation in the Taylor-White process. It is said he received over 100 patents for inventions, included among which were some covering the equipment for the game of tennis at which he was adept, having in 1881 captured the national championship in doubles.

Appreciation of Dr. Taylor's Service

From James M. Dodge, chairman Link-Belt Company, Nicetown, Philadelphia:

It is said that when a philosopher was asked what

was the most enduring work of man his answer was: "A tune," because if it harmonizes with humanity no power, or combination of powers, on earth can prevent its continued life. If not in harmony with humanity, it is soon forgotten and dies. So it is with any new message to the world, if needed and accepted its truth multiplies and its acceptance by humankind increases in an astounding ratio and though of mortal origin it partakes of immortality. Dr. Frederick Winslow Taylor's message to the world, though given by him only a few years ago, has found acceptance in every quarter of the civilized world and has never been rejected by any intelligence that has seriously undertaken to understand his meaning. All history refers only to the two supposedly and up to very recently considered warring factions called capital and labor. No religion; no government and none of our ancient philosophy have undertaken to do more than to relate and tell us of these two classes of human beings.

"Servants, obey your masters," was one of the earliest commands that was given to humanity and no one, so far as we know, has yet demonstrated beyond any possible chance of its being controverted the doctrine that the interests of capital and labor, master and servant, employer and employee are identical and mutually dependent and that the relations can, should, and are being made perfectly harmonious and satisfactory to all concerned by the application of those principles given to us by Dr. Taylor. He was the great emancipator of the worker, inasmuch as by his system and development of the ideas which he has so ably explained to us he has enabled the worker properly to increase his output of the useful without any detrimental results whatsoever, and by so doing has made it possible for the worker to increase his earnings and each individual get the hire for which he is individually worthy.

All opposition to Dr. Taylor's propaganda disappears as soon as his work is investigated. Misconception of his principles and ideals is responsible for such absolutely untrue statements as the one that has been oft repeated, to the effect that workingmen under the "Taylor" system are simply "speeded up" to the limit of human endurance. It has been truly said that "A lie will travel around the world while truth is pulling on his boots" and the "speeding up" error is a wonderful illustration of this statement. The contrary is true; workmen under Dr. Taylor's methods are safeguarded in every way, so that false motion and unproductive efforts are eliminated and all the ability of the worker is turned to the best advantage for the workman and the employer. As well might ignorance attempt to blot out the multiplication table as for the uninformed and prejudiced to stay the spread and stability of Dr. Taylor's work. Efficiency was his predominating personal characteristic. God's greatest gift to mankind is that of ability and desire to attain the higher development.

From H. K. Hathaway, consulting engineer, Philadelphia:

The passing of Mr. Frederick Winslow Taylor, engineer, scientist and philanthropist, has lost to us one of the world's most useful citizens; the originator of a work which is generally recognized as having marked a distinct step in the industrial development of mankind.

He was the father of the great social movement known as scientific management but as this term is generally interpreted it in no sense indicates the widespread influence and usefulness of his life's work. Although his fame has extended to all civilized countries and his books have been translated virtually into every language, the full realization of the inherent soundness of his principles and the incalculable benefits secured through their application was vouchsafed only to the relatively small number of men who were fortunate enough to associate closely with him.

The severe criticism and opposition encountered in the early days of his work would have swerved most men but in his case it but stimulated him to more untiring efforts. It is to this uncompromising attitude that the world is indebted for the legacy which he has bequeathed to it. However, great as his work has been, it is the magnificent example which his life affords of unselfishness, untiring energy, exhaustive thoroughness and the broadest sympathy in the interest of mankind which transcends all else. The rare combination of these qualities coupled with an extraordinary intellect will cause the world to remember Frederick Winslow Taylor as one of the truly great men of his time.

From H. L. Gantt, consulting engineer, New York:

Frederick Winslow Taylor's great contribution to the world's work was to substitute knowledge of human activities for opinion as a basis of action.

His insistence that all industrial questions could be best answered by a scientific investigation was at first scoffed at by many of our industrial leaders, and it was nearly twenty years before he got much support. Now, however, at the end of 35 years his persistence is bearing fruit so rapidly that the whole industrial world is undergoing a revolution due to his ideas.

His death cuts short the activities of a man who has had the welfare of his fellow men at heart, and who has spent much of his life in trying to establish a basis on which the relations between employer and employee can be made mutually satisfactory. When he began his work, all such relations were established by opinions. Today there are few industries in which fact has not supplanted many opinions.

He had the feeling that waste was a crime, and that efficiency in work was a duty not only to ourselves and to our employers, but to the community at large.

His name will live as that of a man who could rise above individual cases and grasp general laws that would make for the happiness and prosperity of all.

From Worcester Reed Warner, Warner & Swasey Company, Cleveland, Ohio:

My friendship with Mr. Taylor and his family has been close and cherished. There crowd upon me delightful memories of the times when I have been his guest at his beautiful home in Germantown. Our meetings when on summer vacations, our many discussions of the efficiency systems with which he has enriched the engineering and industrial world—all these things have drawn me very close to Frederick W. Taylor and I with thousands of his warm admirers today mourn him and the great loss the engineering profession sustains by his death.

I think it was at his own home and fireside that Mr. Taylor was at his best, a devoted husband and father, an elegant gentleman, a most entertaining and hospitable host in a choice home made doubly interesting by his mechanical genius and Mrs. Taylor's artistic taste. It was truly a privilege to be their guest.

During his term of office as president of the American Society of Mechanical Engineers, Mr. Taylor not only gave generously of his time but at his own expense introduced improved systems of accounting and management which have ever since been in use there. One of the characteristics of Mr. Taylor was to give advice and assistance freely. He never took a fee for imparting his expert knowledge, and his earnestness and enthusiasm were an inspiration to young engineers, many of whom will date the beginning of their progress to their acquaintance with Mr. Taylor. When called before the commission at Washington, his perfect mastery of his subject was fully recognized and his testimony given great weight. For ages to come Mr. Taylor will be remembered as having first devised those efficiency systems destined to prove of equal and lasting benefit to the engineer and workman and the manufacturer. All who knew him will extend profoundest sympathy to Mr. Taylor's wife and family.

From James Hartness, president Jones & Lamson Machine Company, Springfield, Vt.:

The passing of Dr. Frederick Winslow Taylor takes away one whose name will be honored and revered by all future engineers and by all students of industrial problems. We are indebted to him beyond computation for his joint invention with Maunsel White of high-speed steel, and, as a result of the analysis of the conditions under which tool steel operated, we are also indebted to him for the founding of a system of analysis of industrial operations.

Thus his method of attacking the problem of greater efficiency in the machine shop resulted in two great inventions, high-speed steel and the Taylor system,

otherwise known as "Scientific Management." The invention of high-speed steel gave to the world a steel of so much greater endurance that the output of even existing machines using such steel was increased many fold. The same is true of many of the schemes of works management that are founded on the analysis of operations to which Dr. Taylor gave a great impetus. These systems have met with antagonism from many trades, especially those in which there has remained a remnant of the good old-fashioned custom of keeping trade secrets and passing them along from father to son. In such trades there has been this instinctive antagonism to anything that should subject the operations to cold analysis and publicity; and perhaps in the process of growth of the Taylor system there have been other grounds for antagonism, but future generations will undoubtedly recognize Frederick Winslow Taylor as one of the world's greatest engineers when measured by the standard of having increased the effective use of man's energies.

From Oberlin Smith, president Ferracute Machine Company, Bridgeton, N. J.:

You ask regarding my appreciation of our lamented friend, Frederick Winslow Taylor, scientist, inventor, gentleman, sportsman, Christian, humanitarian, world's benefactor. Too much cannot be said of his lovely character and great ability.

If the man who makes two blades of grass grow where but one grew before is notable, what shall be said of one who, within a few years, has revolutionized the art of metal-cutting throughout the world, tearing not two, but many, chips from the stubborn steel where one was torn before?

Can we adequately praise the man who, in addition to this important work, has so systematized labor as well as labor's tools, that the world has entered upon a new era of efficiency?

Is not he who has done all of these things for the benefit of the entire race far greater than are the kings, diplomats and soldiers who even now are using every means in their power, including those borrowed from our beloved Taylor, for destroying what he upbuilded—the wealth of the world, and in so doing committing every crime in the calendar?

From Henry R. Towne, chairman Yale & Towne Mfg. Company, New York:

Frederick Winslow Taylor was not only a great leader—he was a pioneer, a discoverer, a creator in two distinct fields of research.

In the art of cutting metals, which underlies all of the metal industries, he found the cutting tool almost unchanged from primitive times; he has left it so transformed that it does three times its previous work and has proportionately increased the output of nearly every machine tool. Under the magic influence of his genius it made a greater advance than during the previous ages since the days of Tubal Cain.

Still greater was his achievement in the field of industrial management, for here he was the creator of a new science where previously was only tradition and empiricism. As I wrote in the foreword to his book "Shop Management," edition of 1911, "In no other field of original research, that I can recall, has investigation, starting from so low a point, attained so high a level as the result of a single continued effort."

He was the first to perceive clearly that in this field as in the physical sciences the Baconian system applies: that a true science must rest on three bases, viz., correct and complete observation of existing *facts*, intelligent and unbiased *analysis* of such facts, and the formulating of laws derived by *deduction* from such investigations and study. While others have co-operated and contributed to the development of this new science of industrial management, to Dr. Taylor belongs the unquestioned credit of having been the first to grasp clearly its full significance and possibilities, and to formulate and codify its fundamental principles, and he will always be recognized and honored as its founder. The catholicity of his fine nature made him welcome the helpful concurrence of all other workers in the field, and rejoice in their contributions and successes.

From Prof. Dexter S. Kimball, professor of machine design and construction, Sibley College, Cornell University, Ithaca, N. Y.:

The death of Frederick W. Taylor has taken from the industrial world a man of great prophetic vision. He was the first to see and grasp fully the principles that underlie economic production and he will be known to posterity as the father and founder of the efficiency movement. His contributions to industrial science, such as his work on belting, high-speed steel and the art of cutting metals, would alone have assured him a permanent place in modern industrial history; but this place is doubly assured by his writings and work on industrial efficiency. For these he has made the entire industrial world his debtor.

Few men have given so fully and unselfishly of their knowledge and experience. Not all agreed as to the immediate possibilities of his methods. But all will agree that a great figure has been taken from our midst, an energetic, earnest and helpful figure, one that will be greater as it recedes from us and whose place will not be filled by any other. A fine man and a great industrial engineer has gone and those of us who knew him personally will regret the passing of the man more than the passing of the great engineer.

From Robert Thurston Kent, consulting engineer and editor of Industrial Engineering, New York:

A mind like that of Taylor occurs but once in a century. It is seldom that there are combined in one man the qualities of energy, perseverance, technical skill, scientific knowledge and the peculiar ability to draw to himself men of large ability and great minds and to so co-ordinate their labors as to make them enthusiastic co-workers with him on a problem which extended over a quarter of a century. It was this combination of qualities given to Taylor which enabled him to pursue the many scientific investigations which resulted in his giving to the world that masterpiece of engineering research, "The Art of Cutting Metals," which has had an indelible effect upon machine tool design and operation throughout the world.

I feel that words are inadequate when we attempt to express the benefits to the whole world which have resulted from this great labor of Taylor's. The principles which he has established are the foundation stones upon which shall be reared a structure which will be the ultimate solution of all the problems of capital and labor, and which will cure most of the industrial ills with which the country now suffers. Taylor's work is not ended. He has laid the foundation. Those of us who remain must build the finished structure, and in the course of years, when he is viewed in his true perspective, in the light of history, I feel that he will be pointed out as one of the greatest engineers that this world has ever known.

From Prof. Hugo Diemer, professor of industrial engineering, Pennsylvania State College, State College, Pa.:

Those of us who knew him intimately will feel a deep personal loss in his early death, and a feeling of intense regret that he did not live to see the inevitable complete reversal of the erroneous opinion of his aims and methods held by the agents of organized labor and by Representatives and Senators. Taylor's ideal was to make each shop an educational institution elevating each workman to the highest mental knowledge as well as manual skill in regard to his work. Again and again he preached that high wages and low labor costs were wholly compatible and the chief aim of management. His work and writings are directly responsible for the extensive research work being carried on in various industries to develop for each industry its own science. His advocacy of the study of the human element is directly responsible for much of the work going on today in the way of welfare activities and vocational guidance. His injunction that the management must actively engage in these activities is the cause of many wealthy men changing their attitude toward industries in which they have interests.

United States Steel Corporation's 1914 Report

Gross Receipts Declined $238,479,366, or 30 Per Cent. Net Earnings Diminished $65,517,729, or 48 Per Cent.

The thirteenth annual report of the United States Steel Corporation covering the operations of the year ended December 31, 1914, presents a sharp contrast to that of the year preceding. In 1913 a surplus of $30,582,183 was left after the payment of full dividends, while the operations of 1914 resulted in a deficit of $16,971,983 after the payment of the full preferred dividend and only 3 per cent. on the common stock. The earnings for the year were the smallest in the history of the corporation, having fallen 48 per cent. below those of 1913. While the production was much under that of 1913 the decrease in prices, averaging $2.54 per ton on the total output, accounted for about $23,000,000 of the $65,517,729 decrease in net earnings. The report, which covers all subsidiaries, enables the following comparison to be made of the financial outcome of the year:

INCOME ACCOUNT

	1914	1913
Gross receipts, sales and earnings	$558,414,933.54	$796,894,299.23
Manufacturing cost and ordinary maintenance	460,485,849.09	610,383,511.53
Administrative and general expenses	18,419,707.64	19,587,315.29
Taxes	12,646,394.28	13,225,882.26
Discounts and interest	3,272,907.81	3,855,873.65
Balance	63,590,074.72	149,841,716.50
Sundry manufacturing and operating revenues and rentals	234,171.29	714,026.87
Income from investments, etc.	3,626,497.57	3,638,614.46
Total income	67,450,743.58	154,194,357.83
Interest charges subsidiary companies	10,082,902.69	9,985,271.98
Balance	57,367,840.89	144,209,085.85
Net balance profits earned by subsidiary companies	14,295,774.28	—7,027,741.02
Net earnings	**71,663,615.17**	**137,181,344.83**
Depreciation funds, etc.	25,143,207.41	23,972,376.13
Balance	46,520,407.76	113,208,968.70
Bond interest and sinking fund	23,148,617.99	31,204,285.53
Balance	23,371,789.77	82,004,683.17
Sundry credit adjustments	+124,978.40	—787,697.55
Total available for dividends, etc	23,496,768.17	81,216,985.62
Preferred dividends paid	25,219,677.00	25,219,677.00
Common dividends paid	15,249,075.00	25,415,125.00
Net deficit	$16,971,983.83	*$30,582,183.62

*Surplus.

The total surplus at the close of the year, after the addition of $878,026.84 for the adjustment of sundry accounts and the appropriation of $500,000 for the permanent pension fund, was $135,204,471.90, against $151,798,428.89 at the close of 1913. This is exclusive of $8,278,545.27 in the surplus of subsidiary companies, representing profits accrued on sales of materials and products to other subsidiaries.

CONDENSED BALANCE SHEET

Following is a condensation of the general balance sheet as of December 31, 1914, liabilities from one subsidiary company to another being omitted from both assets and liabilities:

Assets

Property account	$1,457,853,929.98
Advanced mining royalties	17,266,831.27
Mining royalties for which non-interest bearing notes of subsidiaries have been issued	26,976,000.61
Deferred charges (applying to future operations)	1,784,935.62
Investments	3,477,257.11
Sinking and reserve fund assets	15,804,959.61
Inventories	158,091,036.12
Accounts receivable	37,088,352.01
Bills receivable	5,886,007.20
Agents' balances	1,034,763.61
Sundry marketable securities	2,012,133.06
Cash	61,963,286.60
Total	$1,792,233,492.80

Liabilities

Common stock	$508,302,500.00
Preferred stock	360,281,100.00
Outstanding stock of subsidiary companies	589,042.50
Bonded and debenture debt outstanding	627,045,112.47
Subsidiaries' non-interest bearing notes substituted for previously existing mining royalty obligations	26,976,000.61
Mortgages and purchase money obligations of subsidiaries	6,492,218.04
Accounts payable and payrolls	17,690,376.66
Special deposits or loans due employees and others	999,510.49
Accrued taxes not yet due	8,602,303.52
Accrued interest and unpresented coupon	8,270,718.97
Preferred dividend No. 55, payable February 27, 1915	6,304,919.25
Sundry reserve funds	30,475,218.39
Appropriations for capital expenditures	55,000,000.00
Surplus, exclusive of profits earned by subsidiaries on inter-company sales of products on hand in inventories	135,204,471.90
Total	$1,792,233,492.80

PRODUCTION FOR THE YEAR

The production of raw, semi-finished and finished products by subsidiary companies in the year 1914, compared with 1913, was as follows:

Products	1914 Tons	1913 Tons
Iron ore mined in the Lake Superior Region:		
Mesaba Range	10,894,463	21,634,206
Vermillion Range	1,112,854	1,301,163
Gogebic Range	1,469,601	1,871,700
Menominee Range	874,909	980,346
Marquette Range	496,896	583,266
In the Southern Region:		fil
Tennessee Coal, Iron & Railroad Company's mines	2,186,258	2,367,770
Total	17,034,981	28,738,451
Limestone quarried	4,676,479	6,338,509
Coal mined:		
For use in manufacture of coke	15,890,382	24,081,192
For steam, gas and other purposes	5,271,911	6,705,381
Total	21,162,293	30,786,573
Coke manufactured:		
In bee-hive ovens	7,092,792	11,062,138
In by-product ovens	4,081,122	5,601,342
Total	11,173,914	16,663,480
Blast-furnace production:		
Pig iron	9,909,062	13,879,706
Spiegel	25,397	65,236
Ferromanganese and silicon	117,998	135,788
Total	10,052,457	14,080,730
Steel ingot production:		
Bessemer ingots	4,151,510	6,131,809
Open-hearth ingots	7,674,966	10,524,552
Total	11,826,476	16,656,361
Rolled and other finished products for sale:		
Steel rails (heavy and light and girder)	978,907	1,927,745
Blooms, billets, slabs, sheet and tin-plate bars	921,826	842,175
Plates	689,241	1,108,147
Heavy structural shapes	613,739	988,624
Merchant steel, bars, hoops, bands, skelp, etc.	1,423,740	2,024,192
Tubing and pipe	818,435	1,156,740
Wire rods	164,153	174,478
Wire and products of wire	1,380,374	1,432,132
Sheets (black and galvanized) and tin plate	1,075,419	1,280,537
Finished structural work	521,223	652,363
Angle splice bars and all other rail joints	129,349	256,676
Spikes, bolts, nuts and rivets	62,132	86,465
Axles	64,662	159,075
Steel car wheels	53,638	93,375
Sundry steel and iron products	117,169	152,064
Total	9,014,512	12,374,898
Spelter	25,031	30,424
Sulphate of iron	20,213	33,829
	Bbl.	Bbl.
Universal Portland cement	9,116,000	11,197,000

CLASSIFICATION OF BUSINESS

The volume of business done by all companies during the year, as represented by their combined gross sales and earnings, equaled the sum of $558,414,933, as

compared with $796,894,299 in the preceding year. This amount represents the aggregate gross value of the commercial transactions conducted by the several subsidiary companies, and include sales made between the subsidiary companies and the gross receipts of the transportation companies for services rendered both to subsidiary companies and to the public. The earnings for the year resulting from the above gross business represent the combined profits accruing to the several corporate interests on the respective sales and services rendered, each of which is in itself a complete commercial transaction. The following is a statement of the gross sales and earnings classified by operating groups, gross sales of products being included on basis of f.o.b. mill values:

	1914	1913
Gross sales by manufacturing, iron-ore and coal and coke companies:		
To customers outside of U. S. Steel organization	$380,228,143	$518,999,605
Inter-company sales (sales between subsidiary companies)	129,565,729	211,910,441
	$509,793,872	$730,910,046
Gross earnings and receipts of transportation and miscellaneous companies:*		
Transportation companies	42,040.131	57,726,430
Miscellaneous companies	6,580,930	8,257,823
Total	$558,414,933	$796,894,299

*Includes earnings and receipts both for inter-subsidiary company business and of business with interests outside of the U. S. Steel organization.

SHIPMENTS—DOMESTIC AND EXPORT

The shipments of all classes of products to customers outside of the organization in 1914, in comparison with 1913, were as follows:

Domestic—tons	1914	1913
Rolled steel and other finished products	7,982,325	10,412,430
Pig iron, ingots, spiegel, ferro and scrap	494,144	451,980
Iron ore, coal and coke	1,153,575	1,617,169
Sundry materials and by-products	80,357	88,844
Total tons all kinds of materials, except cement	9,710,401	12,570,423
Universal Portland cement (bbl.)	9,117,752	10,382,883
Export—tons		
Rolled steel and other finished products	1,096,234	1,756,328
Pig iron, ingots and scrap	47,790	56,104
Sundry materials and by-products	190	640
Total tons all kinds of materials	1,144,214	1,813,072
Aggregate of rolled steel and other finished products shipped to both domestic and export trade, tons	9,078,559	12,168,758
Total value of business (covering all of above tonnage):		
Domestic	$337,444,052	$451,181,531
Export	42,784,091	67,818,074
Total	$380,228,143	$518,999,605

The decrease of but 26.7 per cent. in the total value of business in comparison with a decrease of 25.4 per cent. in total tons shipped, notwithstanding there was as before stated an average reduction of $2.54 per ton in selling price, is explained by the fact that in 1914 a relatively larger proportion of the entire shipments was made up of the higher-priced products.

EMPLOYEES AND PAYROLLS

The average number of employees in the service of all companies in the year 1914, in comparison with 1913, was as follows:

	1914	1913
Manufacturing properties	131,616	165,277
Coal and coke properties	16,155	24,996
Iron-ore properties	11,170	13,789
Transportation properties	17,857	21,951
Miscellaneous properties	2,555	2,893
Total	179,353	228,906
Total salaries and wages paid	$162,379,907	$207,206,176
Average per employee per day:		
All employees, exclusive of general administrative and selling force	$2.88	$2.85
Total employees, including general administrative and selling force	$2.97	$2.92

INVENTORIES

The following is a general classification of the inventory valuations at December 31, 1914, in comparison with the valuations at the close of the preceding year:

	1914	1913
Iron ores	$57,874,986	$54,872,841
Pig iron, scrap, ferro and spiegel	9,344,968	8,755,139
Coal, coke and other fuel	3,460,218	4,630,597
Pig tin, spelter, copper, nickel, aluminum and dross and skimmings	4,396,008	6,484,656
Limestone, fluxes and refractories	2,545,741	2,628,408
Rolls, molds, stools, annealing boxes, etc.	6,244,415	6,215,098
Manufacturing supplies, stores and sundry items not otherwise classified	14,897,414	17,259,714
Ingots—steel	1,044,080	1,490,750
Blooms, billets, slabs, sheet and tin-plate bars, etc.	8,426,734	9,246,963
Wire rods	589,587	728,916
Skelp	1,171,962	1,583,275
Finished products	31,660,054	34,315,536
Mining supplies and stores (for ore and coal properties)	2,522,018	3,046,390
Railroad supplies and stores	3,809,151	4,289,490
Merchandise of supply companies	675,159	894,003
Material, labor and expense locked up in bridge and structural contracts $23,644,447		
Less, bills rendered on account 22,219,593	1,424,854	2,428,419
Stocks abroad and on consignment	7,380,012	7,845,017
Material in transit	623,675	919,579
Total	$158,091,036	$167,634,791

MAINTENANCE

The expenditures made during the year for repairs, maintenance and general upkeep of the properties, in comparison with similar outlays in 1913, were as follows:

	1914	1913
Ordinary repairs and maintenance	$40,345,019	$52,551,630
Extraordinary replacements and general rehabilitation	5,027,575	7,391,340
Total	$45,372,594	$59,942,970

GENERAL

The aggregate of all charges to and allowances from gross earnings for the year to cover exhaustion of minerals and to cover deterioration arising from wear and tear of improvements and for obsolescence amounted to $64,847,641, in comparison with a total of $84,237,608 in the preceding year.

The total charges for taxes levied against the corporation and its subsidiary companies, including the Federal income tax for 1914, were $12,646,394, a decrease of $579,488 as compared with 1913. There was an increase during the year of $141,365 in the State and local taxes and a decrease of $720,853 in the Federal income tax.

During the year a total of $10,009,397 of bonds, mortgages, purchase money obligations and mining royalty notes of the corporation and the subsidiary companies was paid off. Of this total $8,729,000 was redeemed through the sinking funds of the mortgages securing the bonds retired. Bonds of subsidiary companies aggregating $9,347,000 were issued and sold during the year for account of outlays made for additions and construction and in refunding a part of the bonds matured and paid off in previous year. There was also assumed a real estate mortgage of $60,000 in connection with the acquirement of a small acreage of coal.

Purchase money obligations of subsidiary companies were issued in the amount of $703,560 for part cost of five steamships purchased. The subsidiary companies also issued their notes (guaranteed by United States Steel Corporation) in the amount of $23,459,482.64 under a revision and adjustment effected of sundry iron-ore mining contracts or leases. The notes so issued represented the balance of the determined and agreed amount of royalties which would become due and payable during the remainder of the terms of such contracts. Of the total amount issued $4,500,000 are interest-bearing notes and $18,059,482.64 non-interest-bearing obligations, and are payable in varying sums annually from 1915 to 1953. These notes take the place of previously existing mining royalty obligations.

The expenditures made during the year by the corporation and the subsidiary companies for additional property, new plants, extensions and construction, and

for stripping and development at mines, totaled $23,171,013.01, namely:

For the new Minnesota steel plant at Duluth, the new cement plant at the same place, and the railroad connecting the plants with trunk lines.	$4,649,196.31
For Tennessee Coal, Iron & Railroad Company extensions	495,264.18
For all other properties:	
Manufacturing properties	6,108,397.03
Coal and coke properties	420,624.22
Iron-ore properties, including net additional expenditure for stripping and development	2,026,178.23
Railroads	7,268,834.97
Steamships	2,046,176.29
Sundry properties	156,341.78

Construction work on the new steel plant at Duluth, also on the new cement plant at same place, together with work on the adjoining townsite of Morgan Park, progressed actively until the early fall of 1914, when construction operations were materially curtailed because of the severe depression in the iron and steel industry. By the expenditure of about $3,000,000 additional these plans will be ready for operation. It is hoped business conditions may warrant the completion of the work during the current year.

At the Edgar Thomson plant of Carnegie Steel Company the installation of a new open-hearth plant of 14 furnaces, together with gas producer plant and the enlargement and improvement of the blooming and No. 2 rail mills, was practically concluded, although there remained at the close of the year about $800,000 yet to be expended for installation of finishing equipment and facilities. The Carnegie Steel Company completed the erection of a distributing warehouse for the New England trade on a site purchased for that purpose near Boston.

At the Gary plant of the Indiana Steel Company there was practically finished during the year a flue dust sintering plant. At the south works of the Illinois Steel Company the remodeling of the rail mill was completed. At the Lorain plant of the National Tube Company an additional hot blast stove and gas cleaning plants were installed at furnaces Nos. 2 and 5.

At Duluth, Minn., the Duluth, Missabe & Northern Railway Company completed the construction of a new concrete and steel ore dock, 384 pockets and track approaches, expending on the same in 1914 $1.002,459. This company also expended $502,123 for remodeling its dock No. 1 to enable limestone to be handled over it, and for additional coal handling equipment on its coal dock.

During the year the various subsidiary railroad companies acquired by purchase or construction, as additions to their complement of equipment, 4 locomotives, 3630 steel gondola and hopper cars, and 10 other cars, at a total cost of $3,990,939; and in the replacement of equipment, 1 locomotive, 205 steel gondola and hopper cars and 6 other cars, at a cost of $242,618.

There were acquired during the year by the United States Steel Products Company, a subsidiary company, six additional steamships for service in the overseas trade. One steamer was lost, the full value of which was recovered from the underwriters. At the close of the year the company owned nine steamers engaged in the overseas trade, and it operates under special charters additional vessels, varying in number from time to time as its business warrants.

At January 1, 1915, the lease of the so-called Great Northern Railway ore properties by the Great Western Mining Company, a subsidiary of this corporation, was canceled in accordance with notice given in 1911 of the intention to exercise the option of cancellation on January 1, 1915, and the properties not already surrendered were turned back to the lessors. During the period the properties were held by the Great Western Mining Company (1907 to 1914, inclusive) that company mined and shipped from them 26,573,808 tons of ore, which tonnage fully covered the total minimums required to be paid for under the lease during the time it was held.

On account of the disturbed and uncertain condition of the steel industry prevailing at the close of the year the large number of employees who at that time were laid off because of mills being shut down or running only on part time, and also because of stock market conditions, it was decided not to offer employees the usual annual privilege of subscribing for stock under the plan which had been observed during each of the preceding 12 years. At the close of the year there were 40,719 employees who had subscribed during the preceding five years and who then either held stock certificates in their own names or were paying for subscriptions in instalments.

During the year there was disbursed by the trustees of the United States Steel and Carnegie Pension Fund the sum of $548,980.62. At the close of the year there were 2521 names on the pension rolls.

British Foundries Making Steel Aeroplane Cylinders and Truck Wheels

Returning last week from a six weeks' sojourn in England where he spent a large part of his time in steel foundries and steel plants, F. T. Snyder, president of the Snyder Electric Furnace Company, Chicago, stated to a representative of *The Iron Age* that every steel foundry and shipbuilding plant was extremely busy, but very much handicapped by labor troubles. The advance in the price of steel products has enabled employers to reap large profits and employees generally are insistent on sharing in the gain. In many cases the latter have won their point. The whole question is being solved, however, by the taking over by the government of the control of plants producing war materiak

Of particular interest is the work of the Daimler Company, Ltd., at Coventry, where 10 aeroplanes per week are being constructed for military purposes. For these the company is casting Gnome engine cylinders, regarded as extremely difficult to pour successfully in steel. Formerly these were cut from a solid piece of steel, but this company now pours them from steel made in Stock converters, of which it has four of 1-ton capacity each. The quality of steel is of the highest, it being blown only from a high grade of hematite pig iron, no scrap being used. The company expects to turn out 30 aeroplanes per week in the near future.

British steel foundries in general are now unusually busy, said Mr. Snyder, in producing motor truck wheels, for which the demand is heavy for military purposes. The Belgian supply of these has been entirely stopped, forcing England to manufacture her own. Success has been attained by these efforts, one foundry pouring 50 four-wheel sets per week. Most of these wheels are hollow, averaging 3/16 in. in metal thickness, the set approximating 700 lb. The mortality of these trucks and wheels in war service is great, necessitating a large and constant supply. Though very difficult to pour, ordinarily, Mr. Snyder said, unusual success has been achieved in most cases, one foundry not having lost a single wheel in many weeks. In this case also converter steel has met the needs of the case, though questions of the cost of production in these or of the aeroplane cylinders have cut no figure. At the Stockton Steel Foundry Company, Ltd., Stockton-on-Tees, 25-ton castings are being made with small converters.

New Line of Cast-Iron Volume Blowers

The Clarage Fan Company, Kalamazoo, Mich., has brought out a line of cast-iron volume blowers comprising four sizes, with outlet connections ranging from 5 to 9 in. in diameter. The housing or fan case is a single casting, supported by cast-iron side plates which are larger than the wheel. By taking out eight cap screws and removing the plate, it is possible to withdraw the wheel from the housing, a feature which makes the fan adjustable and reversible and enables seven different directions of discharge to be secured. The bearings, which are inclosed, are of a special dust-proof oil-tight type, and the arm supporting the bearing may be placed on either side of the fan.

The blowers are regularly furnished as a single-inlet exhaust fan, with a collar for the suction pipe. This type of fan is designed for removing smoke, chemical vapors or fumes from forge fires, vats or kettles, or dust from emery wheels or tumbling barrels or shavings from wood-working machines. By removing the collar and plate, the fan can be used as a blower with two inlets to furnish blast for forge fires, coke ovens, drying systems, or for serving as forced draft fan for small boiler plants.

ESTABLISHED 1855

THE IRON AGE

EDITORS:
A. I. FINDLEY
GEO. W. COPE W. W. MACON
CHARLES S. BAUR, *Advertising Manager*

Published Every Thursday by the DAVID WILLIAMS CO., 239 West Thirty-ninth Street, New York

W. H. Taylor, *Pres. and Treas.* Charles G. Phillips, *Vice-Pres.* Fritz J. Frank, *Secretary* M. C. Robbins, *Gen. Mgr.*

BRANCH OFFICES—Chicago: Otis Building. Pittsburgh: Park Building. Boston: Equitable Building. Philadelphia: Real Estate Trust Building. Cleveland: New England Building. Cincinnati: Mercantile Library Building.

Subscription Price: United States and Mexico, $5.00 per year; to Canada, $7.50 per year; to other foreign countries, $10.00 per year. Entered at the New York Post Office as Second-class Mail Matter.

The Steel Corporation's Report

While the Steel Corporation's earnings in the calendar year 1914 became known upon the publication of the fourth quarter's report late in January, the tonnage figures given in the annual report are new. The total production of iron and steel products, weighed in the form in which they were sold to customers outside the organization, was 9,014,512 tons, a drop of 27 per cent. from the tonnage of 1913, and a drop of 28 per cent. from that of 1912, the year of the corporation's largest output. From 1913 to 1914 domestic shipments, as distinct from production, decreased 22.8 per cent. and export shipments decreased 36.9 per cent., while the total shipments decreased 25.4 per cent. The total value of the business decreased 26.7 per cent. The percentage decrease in value was but slightly more than the decrease in shipments, though it is stated there was an average decline of $2.54 per ton in selling prices; but the report explains that in 1914 a relatively larger proportion of the entire shipments was made up of the higher-priced products.

This divergence is a familiar one in the ups and downs of the steel trade. In lean years the demand for wire products, tin plates and a few other items decreases very much less than does the demand for such low-priced products as rails and structural shapes. There is an interesting exception in the case of blooms, billets, slabs and sheet and tin-plate bars, as the corporation made of these products in 1914 for sale 921,826 tons, or nearly 10 per cent. more than in 1913.

The decrease in railroad demand in 1914 has been fully recognized, but now there are available precise figures. The Steel Corporation produced only 978,907 tons of all classes of rails, a decrease of 49 per cent. from 1913 and of 54 per cent. from 1910, the corporation's record year for rail production. It is impressive to note that the corporation's rail output in 1914 was a trifle less than one-half its output in 1906, before it had either the Ensley or the Gary plants.

In lean years the production of Bessemer steel has always suffered more than the production of open-hearth steel, a fluctuation which cannot readily be accounted for in the character of demand, since the products that stand up best in point of demand in lean years, wire and tin plate, do not run to open-hearth. Structural shapes, which are made practically altogether of open-hearth steel, and rails, which have been running very rapidly to open-hearth, were in particularly light demand last year, yet the Steel Corporation's output of ingots decreased from 1913 by 32 per cent. in the case of Bessemer and by 27 per cent. in the case of open-hearth. Possibly the explanation of these swings is that since the open-hearth plants as a class are the newer they are the more economical in operation. The Steel Corporation's maximum output of Bessemer steel ingots was in 1906, at 8,072,655 tons. The corresponding output in 1914 was 51½ per cent. as great. At the same time the open-hearth ingot production increased 41½ per cent. Extensive compilations are sometimes made to indicate the extent to which the Steel Corporation has been bettering its properties, or "squeezing out the water," but to the practical steel manufacturer the manner in which the corporation has been able to swing from Bessemer to open-hearth steel is perhaps a more impressive fact than can be presented in such compilations.

Progress in Testing Steel

Who shall say that the pitch or volume or timbre of sound emitted by a rail as the result of a given excitement may not be made to disclose pitilessly its hidden defects and to measure the fitness, not alone of the material of which it is composed, but of the rail as a whole structure?

This striking semi-prophecy from the opening address of Prof. Henry M. Howe at the sixth congress of the International Association for Testing Materials, held in New York, while not yet realized, more closely represents the trend of practice than perhaps was appreciated by his hearers.

Advance in the use of indestructive tests—those which have no effect on the piece subjected to examination—has been marked. Progress in microscopic investigation has been more rapid than was expected at its inception. The critical metallographic inspection of the surface of important moving parts of American battleships has already been suggested and undertaken with beneficial practical results, as recounted in an article in *The Iron Age* of February 4, 1915. And the possibilities of the revelations of the microscope have not begun to be realized. It is suggested that the presence of cavities may be detected through a determination of a metal's density; that the occurrence of plastic deformation may be settled by ascertaining the potential; and that even electrical disintegration may be used as a possible means of testing. Much attention has been given to magnetic testing.

A field of inspection not hitherto suggested has received considerable attention of late. *The Iron Age* of February 4 and March 4, 1915, presented very recent data on the application of the X-ray in metallurgical research. The successful detection of cavities and other results of the examination of the interior structure of both steel and copper castings were told in these articles. The X-ray seems to offer a means of metallurgical research replete with attractive and desirable features foreign to other methods and offering a wide field for further work.

In the magnetic realm recent tests published in these columns show that in medium carbon steel the hysteresis loss is the least where large grains are combined with coarsely laminated pearlite; that a mere statement of the condition of the metal as hardened or unhardened, annealed or tempered is often misleading and idle. This being so, may it not later be possible to ascertain the structure of steel by determining its hysteresis loss or by studying the variation in permeability of the different parts of a piece of steel during the transit of the magnetic field?

In all this there may "lie the suggestion that we may learn the properties of the very rails and girders which we are to use and later the properties of the assembled structures themselves and conceivably in the far, far distant future the assembled hull, by their action and reaction with some form of energy."

Britain Kneels to Unions

The exceedingly delicate manner in which the British Government has been obliged to handle certain labor questions may appear altruisitic to certain minds, but to the average man it seems practically an abrogation of what should be its supreme function. An individual employer is obliged to take heed most carefully of labor customs and practices if he would avoid difficulties and misunderstandings with his workmen. They are on the same plane with himself, their labor and services being rendered in return for the compensation he gives. If he proposes to depart from regular customs or practices obtaining in his branch of business he must expect some conflict of opinion among his employees, to be overcome either by reason, persuasion or perhaps a trial of force.

The government of a nation is in a totally different position from that of an ordinary employer. If a government desires military service from its citizens, and that service is not voluntarily forthcoming, it exerts its undisputed power of conscription. It might be assumed, therefore, that the same conditions would apply in case the government desired the services of workmen in performing necessary functions in keeping up its supply of munitions or armament in case of war. The British Government, however, according to London advices under date of March 17, appears to consider the labor power as on an equality with itself. This is practically what the action of that government means when, in connection with its announcement of the taking over the control of factories in England for the production of war material, a conference was called of labor leaders and representatives of various industries. At the conference David Lloyd George, Chancellor of the Exchequer, made this appeal:

> Recent battles have shown that the tremendous concentration of artillery fire recently—the greatest which has been witnessed upon any given point during the whole war—not only has insured success but has saved the lives of soldiers who made the attacks. Therefore, if the workmen and factory owners desire to see the country win and are anxious to save the lives of the men they must accelerate the output of munitions. To assist in this, the government has decided to take over the works. In doing so, the government proposes to impose a limitation on the profits and to ask the men to relax trade union restrictions and put their whole strength into the work.

Proceeding, the chancellor asked that, while the war lasted, trade union restrictions which tended to diminish the output should be suspended so far as they concern semi-skilled and female labor "which had been usefully employed in the French munition factories." This attitude of a great government appears not only undignified but actually pusillanimous. It is of course in line with developments in recent years in the handling of the labor question in Great Britain. The government has progressively been brought under control of labor leaders, and now at this supreme moment in the life of the nation the representatives of the government feel compelled to beg the labor leaders simply to be fair. They apparently do not look for overwork or for greater application in turning out needed products, but very respectfully ask that restrictions be not imposed at this time so that a workman's output shall be normal for the average man. It is a belittling of the powers of government. The dispatches state that at this conference the labor delegates promised the government their whole support. This was probably received as a gracious offer. What the representatives of the government would have done if the labor delegates had not expressed themselves so considerately is a problem.

Steel Works Selling Pig Iron

The mills that produced wrought iron prior to the advent of soft steel were as a rule purchasers of the pig iron they refined. As large Bessemer steel works were built it became customary to establish blast furnaces in connection with their operations, but even fifteen years ago there were notable exceptions to this custom, to the extent that many large steel interests purchased a considerable proportion of the pig iron they used. At that time, and for several years thereafter, it was thought to be a wise arrangement for a steel interest to have blast furnace capacity only sufficient for the average rate of operation, and to buy pig iron when it was desired to operate the steel works at or near capacity. The blast furnace investment per ton of output was held in many quarters to be so large as to make it undesirable unless it could be made to yield returns practically all the time. Later the view changed and by 1907 practically all the large steel works had built or projected blast furnaces sufficient to make their operations entirely self contained. It is well to suggest, however, that lately there have not been such tests of capacity at most of the steel works as would make it certain that the attendant blast furnaces are really entirely adequate. From the beginning of steel making it has been the constant experience that the whole operation, from the ore

and coking coal in the ground to the finished merchantable steel, cannot be kept aligned, that one department or another is sure to run ahead or fall behind.

While it is only very recently that the large steel works became self contained, the changes have not stopped there. With scarcely a halt at the stage of the large steel mills as a whole being merely balanced with their attendant blast furnaces, some of them have already gone in the other direction and have surplus blast furnace capacity, whereby they are sellers of merchant pig iron. The case of the Tennessee Coal, Iron & Railroad Company is not in point in connection with this argument, even though it is a regular seller of merchant pig iron, for the reason that originally this was a merchant pig iron interest, and adopted steel-making to furnish an outlet for a part of its pig iron. Nor, perhaps, is the case in the Buffalo district, where there is a merchant furnace and a steel works operation that are closely allied as to ownership, a telling point in connection with the argument, but the operations at Indiana Harbor, Monessen and South Bethlehem are all distinct instances of planning whereby a surplus of pig iron will be available for sale. So many hundreds of thousands of tons of pig iron are sold or available for sale by these various steel interests that it is time to recognize that this policy has a distinct and firm hold upon the trade. It may easily be that five years hence the proportion of pig iron sold may be much larger. If it were not that there are many small steel works, and also many steel casting works, the merchant furnaces would have no business at all, in ordinary times, in steel making pig iron. As it is, last year's statistics of Bessemer pig iron indicated that little, if any, of the product was sold to regular Bessemer steel works.

Various causes have contributed to this change in alignment, and different causes at different works. There is one general economic cause, however, that it is more profitable in the long run to have very small profits, or none at all, in merchant pig iron sold in poor times, than it is to pay fancy prices for merchant pig iron in very good times. In certain instances there is the feature of an attendant retort coke oven plant, furnishing gas that can always be used, and gas, coke-oven or blast-furnace gas, has become an important factor. It will be recalled that the first production at the Gary plant was nominally of pig iron, but practically the pig iron was a by-product, since two blast furnaces were operated for the direct purpose of producing gas.

The trend of affairs gives the merchant blast furnace interests occasion for much earnest thought. Two general courses are open, and one or the other must be chosen. The one is to restrict the investment as much as possible, and be content with profits in good years only. If the market is to fluctuate in future as it has in the past, there may be profits enough in one year to pay a return upon a moderate investment for three years. The other course offered is to enlarge the investment as far as necessary to comprehend every possible saving, including full provision for ore and for coke made in the most economical manner, and to make the operation as a whole so good that it will have a prospect of earning something all the time.

CORRESPONDENCE

Boring Liberty Bell to Check the Crack

To the Editor: Noticing the suggestion by Thomas D. West in your issue of this date of a method for prevention of spreading of the new crack in the Liberty Bell I inclose a printed copy of my first report to the curator of the museum of Independence Hall, which he transmitted to the former mayor on April 17, 1909, and in which the same plan was proposed. It was not carried out, mainly because there is a sentimental objection to tampering with this sacred relic in any way. Years ago the original crack was widened greatly in a futile attempt to restore the tone by drilling holes all along the old crack, the marks of the drill still remaining. This was, of course, a foolish thing to do and showed great ignorance on the part of the care-takers at that time.

ALEX. E. OUTERBRIDGE, JR.

Philadelphia, Pa., March 18, 1915.

Mr. Outerbridge's letter of April, 1909, referred to above is as follows.—EDITOR.

WILFRED JORDAN, ESQ.,
Curator of Independence Hall:

DEAR SIR:—Replying to your request for an expression of opinion from me in regard to possible risk of extension of the crack in the Liberty Bell, caused by vibration on railroad trains in the event of its taking a long journey to Seattle: I have no hesitation in stating my belief that there is a very real risk and indeed strong probability of such extension, even though no accident should occur in the transportation there and back. All metal castings are subject to internal strains due to natural shrinkage in cooling. These are known as cooling strains. The original crack was doubtless the result of such strains.

Your statement that prior to the removal of the bell from its resting place during Founders' Week you made careful measurements of the crack, and after it had been carried in the processions in this city you re-measured the crack and found an appreciable, though slight, increase in length, is interesting though not surprising to me. It is customary, when cracks occur in castings that do not necessarily impair their usefulness, to drill a very small hole through the metal a short distance beyond the visible crack. This effectually prevents its further increase unless subjected to extraordinary shock. It might be well to consider the advisability of thus protecting the bell.

In conclusion, I would say that I think it would be eminently proper and advisable that Councils should pass a resolution preventing the removal of the bell from Independence Hall in future.

ALEX E. OUTERBRIDGE, JR.

Lake-and-Rail Freight Advances Suspended

WASHINGTON, D. C., March 23.—The tariffs recently filed with the Interstate Commerce Commission advancing the lake-and-rail and rail-lake-and-rail rates, effective March 27, have been suspended until July 17, to permit the commission to make further investigation as to their reasonableness. These tariffs were filed in pursuance of the decision of the commission in the 5 per cent. advance case, as construed by the carriers, but it is now pointed out that these particular rates were excluded from the ruling, the commission having stated that "it is shown on the record that since the rail carriers acquired ownership and control of the lake lines successive increases have been made in the rates via lake tending to lessen the difference between them and the all rail rates." W. L. C.

The properties of Lacey-Buek Iron Company were sold at Birmingham, Ala., under decree of the Federal court, to the Michigan Trust Company for $300,000, it being the only bidder, and the sale was affirmed. The sale followed a decree in favor of the Continental Commercial & Trust Company, which held a mortgage on the Trussville furnace and other properties of the company.

SERIOUS TREASURY DEFICIT

Overhauling of Revenue and Tariff Laws the Only Real Remedy

WASHINGTON, D. C., March 23, 1915.—As the result of the extravagance of the Congress which has just expired and the failure of the Underwood-Simmons tariff act as a revenue producer, the administration within a short time will be obliged to choose between an enormous issue of Panama Canal bonds or of Treasury certificates and the passage of a comprehensive revenue measure that, among other things, will extend the emergency war revenue act for another year and repeal that provision of the existing tariff law under which sugar will be placed on the free list May 1, 1916. There is to-day a deficit in the treasury for the fiscal year to date of $109,109,000, exclusive of a shortage in the postal revenues estimated at $20,000,000. The net cash balance in the treasury, which must finance a nation that spends over a billion dollars a year, is to-day but $39,110,000. In other words, the working cash balance of the Government of the United States is to-day less than 4 per cent. of its annual turnover.

The net ordinary disbursements for the fiscal year to date aggregate $523,350,000, as compared with $498,610,000 a year ago, an increase of about $25,000,000, notwithstanding the fact that general conditions throughout the country have been such as should have taught the most extravagant Congress a stern lesson of economy. The total customs receipts to date are $153,000,000, as compared with $216,930,000 on the corresponding date a year ago, a loss of about $64,000,000. Internal revenue receipts, including the revenue derived from the emergency act, aggregate to date $235,500,000, as compared with $227,000,000 a year ago, a gain of but a little more than $8,000,000, notwithstanding the fact that the emergency act, which has now been in force more than four months, was estimated to produce $6,750,000 per month. Miscellaneous receipts to date are about $52,000,000, as compared with about $37,000,000 a year ago, and this apparent gain of $15,000,000 is being widely quoted by certain officials as "reflecting generally satisfactory conditions" throughout the country. In none of these statements has the interesting fact been disclosed that nearly $12,000,000 of this increase in miscellaneous receipts is due to the sale of two battleships to Greece.

The comparatively slight effect of the European war upon the revenue situation appears from the fact that the total decrease in imports for the eight months of the current fiscal year as compared with the same period a year ago has been but 15 per cent.; but the reduction in customs revenue for the same period has been no less than 30 per cent. Had the Payne-Aldrich tariff act been in force in the past eight months the cash balance in the Treasury would have exceeded $75,000,000, or well above the danger line.

The war tax law, estimated to yield $80,000,000 per annum, stands repealed on January 1 next and sugar, which is now producing revenue at the rate of $45,000,000 per year, goes to the free list in the following May, thus effecting a total reduction in revenue of $125,000,000 below the current level which has brought the Federal Treasury to the brink of insolvency. Nothing but a comprehensive overhauling of the tariff and revenue laws can restore the government to a sound business footing. The administration's fear of the effect of the summoning of an extra session of Congress, however, promises to result in the adoption of a makeshift in the form of a $100,000,000 issue of Panama Canal bonds, originally intended solely for the construction of the big waterway, or the sale of a gigantic block of Treasury certificates, the floating of which will mean an increase in the national debt with resulting augmentation of tax burdens. W. L. C.

After April 1 the general offices of W. J. Rainey, coke producer, now at 527 Fifth avenue, New York, will be located in the Vanderbilt Concourse Building, 52 Vanderbilt avenue, at East Forty-fifth street.

CONTENTS

Drawing Smaller Sizes of Brass Tubing 661
Direct Reading Time Study Watch 663
Feeding Attachment for Swaging Machine 663
Russia from the Point of View of an American Engineer and Business Man 664-665
Status of Electric Smelting of Iron Ores 668
Attachment for Drilling Small Pieces 669
Cast Iron with Wrought Iron Added 669
Carnegie Steel Company's Boston Warehouse 670
Knuckle Guard for Wheelbarrow Handles 672
A Vertical Single-Acting Triplex Hydraulic Pump 672
A New Diesel Engine Bulletin 672
A New Rail Fastening 673
A High Carbon 135-lb. Rail 673
Preventing Defects in Ingots 673
Cost of a Government Armor Plate Plant 674
Iron Smelting in the Philippines 675
Frederick W. Taylor Dead 676
United States Steel Corporation's 1914 Report 679
British Foundries Making Steel Aeroplane Cylinders and Truck Wheels 681
New Line of Cast-Iron Volume Blowers 681
The Steel Corporation's Report 682
Progress in Testing Steel 682
Britain Kneels to Unions 683
Steel Works Selling Pig Iron 683
Correspondence 684
Lake-and-Rail Freight Advances Suspended 684
Serious Treasury Deficit 685
New York Safety Council 685
The Iron and Metal Markets 686
Safety in Ohio Foundries 698
Milwaukee Metal Trades Meeting 698
Third Vote on Sheet and Tin Mill Wages 698
Robesonia Iron Company to Build New Furnace 698
Decreasing Imports of Manganese Ore 698
Germany's January Pig-Iron Output 698
January Foreign Iron Trade 699
Increase in Exports of Machine Tools and Automobile Trucks 699
Rail Injuries from Gagging 700
Sheet Metal Trades Club 700
Powdered Coal Fire at Troy, N. Y. 701
British Steel Exports Fall Off 45 Per Cent. 701
More Enlargement of Sheet-Making Capacity 701
Trade Commission Not to Harrass Business 702
New Members American Iron and Steel Institute 703
Steel Works' Benzol Plants 703
Personal 704
Pittsburgh and Nearby Districts 705
Machinery Markets and News of the Works 706
Customs Decisions 713
Trade Publications 714

New York Safety Council

Conservation Is Object of Local Branch of National Body

Members of the National Safety Council in business in New York as manufacturers and representatives of railroads and large industries organized the New York Safety Council at the Biltmore Hotel, March 17, for work under the auspices of the national body in the promotion and conservation of individual, industrial, and community life in New York and vicinity.

Officers were elected as follows: President, Marcus A. Dow, New York Central Lines; vice-presidents, Carl M. Hanson, Workmen's Compensation Service Bureau, and Lancaster Morgan, General Chemical Company; secretary, L. A. Larsen, American Locomotive Company; treasurer, G. M. Cooper, American Bridge Company; chairmen of committees, H. A. Bullock, Brooklyn Rapid Transit Company; J. L. Murrie, New York Edison Company; Walter G. King, Julius King Optical Company, and C. L. Close, United States Steel Corporation.

The Ohio Corrugating Company, Warren, Ohio, has under way the construction of its new plant, which will be located adjacent to that of the Trumbull Steel Company. The main building will be 80 x 300 ft., and it is stated that when this is completed another building of the same size will be erected.

The Iron and Metal Markets

HEAVY PIG-IRON SALES

Buffalo Furnaces Sell Freely at $12

Export Steel Sales Increase, But New Domestic Buying is Less Satisfactory

Buffalo furnace companies have shaken the pig-iron market out of its stagnation in the past week by offering their product at prices attractive enough to bring over 175,000 tons to their order books. The bulk of the business was done in three or four days and the end of the movement has not yet been seen. In the main $12 at furnace for No. 2 X foundry iron was the basis, or 50 to 75 cents below the recent level, with indications that some No. 2 iron went at $11.75 or less.

New York, New England and New Jersey foundries took hold freely as the Buffalo cut became general, and some buyers covered for the entire year. Most of the sales were for the second half, and while a number of 5000-ton lots were included there were scores of sales of 500 and 1000 tons.

So quietly was the Buffalo coup executed that other districts scarcely felt a tremor, but it is to be expected that, as in November, when Buffalo furnaces sold 250,000 tons in ten days, foundrymen in the Central West and the Chicago district will come into the market. Thus far furnace companies in those sections have not offered concessions such as have resulted from the large production of Buffalo iron, but in the Cleveland district in the past week lower prices have been made on Indiana business. These with the unsettling of Southern prices due to liquidation of warrant iron have made a weak market. However, some important Southern makers have refused offers of $9.25, Birmingham, for the second half.

In the finished steel market the main features are continued operations by most of the larger companies on a 70 per cent. scale, further large war orders from abroad, and a volume of new domestic business somewhat less than that of shipments. Chicago district mills are running on a 60 to 65 per cent. basis.

The expiration on March 31 of some of the contracts at 1.05c. and 1.10c., Pittsburgh, for plates, shapes and bars, is counted on to bring in specifications freely in the coming week. On April 1, according to the schedule announced by leading makers some weeks ago, 1.20c. is to take the place of 1.15c., Pittsburgh, as the forward delivery price on the three heavy products. As with advances in the wire trade, the effort will be to get specifications on provisional business closed at 1.15c.

There is still surprise at so good a volume of business as the mills now have, with railroad buying so limited; but the domestic sources are widespread. While shipments in the next two months may exceed new orders, implement and other large bar contracts are counted on to restore the balance in June. The country's remarkable export trade of February, and in iron and steel lines the greater foreign sales of March, are adding to hopeful sentiment.

Items in the latest export sales are 12,000 tons of rails which the Steel Corporation will ship to the Orient; 15,000 tons, principally plates, booked for Japan in the Chicago district; 110,000 boxes of tin plates for China, Japan and India; 25,000 tons of barb wire closed by one Central Western company, 10,000 tons by another and 4200 tons of wire rods; 6000 tons of skelp and small billets bought at Youngstown for England. On the last named $1 a ton more than domestic prices was realized.

The Mahoning Valley members of the union look for favorable action on the third Amalgamated Association vote, to be taken this week, on the proposed sheet and tin plate wage reductions. This would start mills which the union has held in line with difficulty.

Sheet bar prices show some variation, but sales of 6000 and 9000 tons of Bessemer bars are reported at $21, Pittsburgh. In Ohio a 5000-ton sheet bar inquiry is pending.

The advance of $2 on galvanized wire products is not general. The decline in spelter is a factor; but it remains to be seen how long spelter users, whose abstention caused the decline, can stay out of the market.

London reports that American independent steel companies will establish a joint selling agency there are at least premature. Thus far there is more agitation of the proposal in London than on this side.

A Comparison of Prices

Advances Over the Previous Week in Heavy Type. Declines in Italics

At date, one week, one month, and one year previous.

	Mar. 24, 1915.	Mar. 17, 1915.	Feb. 24, 1915.	Mar. 25, 1914.
Pig Iron, Per Gross Ton:				
No. 2 X, Philadelphia....	$14.25	$14.25	$14.25	$15.00
No. 2, Valley furnace....	13.00	13.00	13.00	13.25
No. 2 Southern, Cin'ti...	12.15	12.15	12.40	14.00
No. 2, Birmingham, Ala..	9.25	9.25	9.50	10.75
No. 2, furnace, Chicago*	13.00	13.00	13.00	14.25
Basic, del'd, eastern Pa.	13.50	13.50	13.50	14.25
Basic, Valley furnace....	12.50	12.50	12.50	13.00
Bessemer, Pittsburgh...	14.55	14.55	14.55	14.90
Malleable Bess., Ch'go*..	13.00	13.00	13.00	14.25
Gray forge, Pittsburgh...	13.45	13.45	13.45	13.65
L. S. charcoal, Chicago..	15.75	15.75	15.75	15.25
Billets, etc., Per Gross Ton:				
Bess. billets, Pittsburgh.	**20.00**	19.50	19.50	21.00
O.-h. billets, Pittsburgh.	**20.00**	19.50	19.50	21.00
O.-h. sheet bars, P'gh...	**21.00**	20.50	20.50	22.00
Forging billets, base, P'gh	**25.00**	24.00	24.00	25.00
O.-h. billets, Phila.....	21.52	21.52	21.52	23.40
Wire rods, Pittsburgh...	25.00	25.00	25.00	26.50
Old Material, Per Gross Ton:				
Iron rails, Chicago.....	12.00	12.00	11.75	12.75
Iron rails, Philadelphia..	13.00	13.00	13.00	16.50
Carwheels, Chicago.....	9.75	10.00	10.00	11.75
Carwheels, Philadelphia..	11.00	11.00	11.00	12.25
Heavy steel scrap, P'gh.	12.00	12.00	11.75	12.00
Heavy steel scrap, Phila.	11.00	11.00	10.00	11.00
Heavy steel scrap, Ch'go	9.25	9.75	9.75	9.75
No. 1 cast, Pittsburgh...	**12.00**	11.25	11.25	11.50
No. 1 cast, Philadelphia.	12.00	12.00	12.00	13.00
No. 1 cast, Ch'go (net ton)	9.00	9.00	9.00	10.25
Finished Iron and Steel.				
Per Lb. to Large Buyers:	Cents.	Cents.	Cents.	Cents.
Bess. rails, heavy, at mill	1.25	1.25	1.25	1.25
Iron bars, Philadelphia..	1.15	1.15	1.20	1.22½
Iron bars, Pittsburgh....	1.10	1.10	1.10	1.35
Iron bars, Chicago.....	**1.12½**	1.10	1.10	1.15
Steel bars, Pittsburgh...	1.15	1.15	1.10	1.20
Steel bars, New York....	1.319	1.319	1.269	1.36
Tank plates, Pittsburgh..	1.10	1.10	1.10	1.15
Tank plates, New York..	1.269	1.269	1.269	1.31
Beams, etc., Pittsburgh..	1.15	1.15	1.10	1.15
Beams, etc., New York..	1.269	1.269	1.269	1.31
Skelp, grooved steel, P'gh	1.10	1.10	1.10	1.20
Skelp, sheared steel, P'gh	1.15	1.15	1.15	1.25
Steel hoops, Pittsburgh..	1.25	1.25	1.25	1.25

*The average switching charge for delivery to foundries in the Chicago district is 50c. per ton.

Sheets, Nails and Wire,	Mar. 24, 1915.	Mar. 17, 1915.	Feb. 24, 1915.	Mar. 25, 1914.
Per Lb. to Large Buyers:	Cents.	Cents.	Cents.	Cents.
Sheets, black, No. 28, P'gh	1.80	1.80	1.80	1.95
Galv. sheets, No. 28, P'gh	3.40	3.40	3.40	2.95
Wire nails, Pittsburgh	1.60	1.60	1.60	1.60
Cut nails, Pittsburgh	1.55	1.55	1.55	1.65
Fence wire, base, P'gh	1.40	1.40	1.40	1.40
Barb wire, galv., P'gh	2.10	2.10*	2.00	2.00
Coke, Connellsville,				
Per Net Ton at Oven:				
Furnace coke, prompt	$1.50	$1.50	$1.50	$1.85
Furnace coke, future	1.65	1.65	1.65	2.00
Foundry coke, prompt	2.00	2.00	2.00	2.40
Foundry coke, future	2.15	2.15	2.15	2.65
Metals,				
Per Lb. to Large Buyers:	Cents.	Cents.	Cents.	Cents.
Lake copper, New York	**16.00**	15.25	15.25	14.87½
Electrolytic copper, N. Y.	**15.37½**	14.75	14.62½	14.50
Spelter, St. Louis	**9.35**	9.12½	9.35	5.12½
Spelter, New York	*9.50*	9.62½	9.50	5.27½
Lead, St. Louis	**4.05**	4.00	3.77½	3.87½
Lead, New York	4.10	4.10	3.85	4.00
Tin, New York	*50.50*	52.50	38.60	38.50
Antimony, Hallett's, N. Y.	27.00	27.00	19.00	6.75
Tin plate, 100-lb. box, P'gh.	$3.35	$3.35	$3.10	$3.30

*An error was made in printing this price 2.30c. last week.

Finished Iron and Steel f. o. b. Pittsburgh

Freight rates from Pittsburgh in carloads, per 100 lb.: New York, 16.9c.; Philadelphia, 15.9c.; Boston, 18.9c.; Buffalo, 11.6c.; Cleveland, 10.5c.; Cincinnati, 15.8c.; Indianapolis, 17.9c.; Chicago, 18.9c.; St. Louis, 23.6c.; Kansas City, 43.6c.; Omaha, 43.6c.; St. Paul, 32.9c.; Denver, 68.6c.; New Orleans, 30c.; Birmingham, Ala., 45c.; Pacific coast, 80c. on plates, structural shapes and sheets No. 11 and heavier; 85c. on sheets Nos. 12 to 16; 95c. on sheets No. 16 and lighter; 65c. on wrought pipe and boiler tubes. The foregoing rates to the Pacific coast are by rail. The rate via New York and the Panama Canal has no stability, being dependent on vessel charges.

Plates.—Tank plates, ¼ in. thick, 6¼ in. up to 100 in. wide, 1.10c. to 1.15c., base, net cash, 30 days. Following are stipulations prescribed by manufacturers, with extras:

Rectangular plates, tank steel or conforming to manufacturers standard specifications for structural steel dated February 6, 1903, or equivalent, ¼ in. and over on thinnest edge, 100 in. wide and under, down to but not including 6 in. wide, are base.

Plates up to 72 in. wide, inclusive, ordered 10.2 lb. per sq. ft., are considered ¼-in. plate. Plates over 72 in. wide must be ordered ¼ in. thick on edge or not less than 11 lb. per sq. ft., to take base price. Plates over 72 in. wide ordered less than 11 lb. per sq. ft. down to the weight of 3-16 in. take the price of 3-16 in.

Allowable overweight, whether plates are ordered to gauge or weight to be governed by the standard specifications of the Association of American Steel Manufacturers.

Extras	Cents per lb.
Gauges under ¼ in. to and including 3-16 in.	.10
Gauges under 3-16 in. to and including No. 8	.15
Gauges under No. 8 to and including No. 9	.25
Gauges under No. 9 to and including No. 10	.30
Gauges under No. 10 to and including No. 12	.40
Sketches (including straight taper plates), 3 ft. and over	.10
Complete circles 3 ft. in diameter and over	.20
Boiler and flange steel	.10
"A. B. M. A." and ordinary firebox steel	.20
Still bottom steel	.30
Marine steel	.40
Locomotive firebox steel	.50
Widths over 100 in. up to 110 in., inclusive	.05
Widths over 110 in. up to 115 in., inclusive	.10
Widths over 115 in. up to 120 in., inclusive	.15
Widths over 120 in. up to 125 in., inclusive	.25
Widths over 125 in. up to 130 in., inclusive	.50
Widths over 130 in.	1.00
Cutting to lengths, under 3 ft. to 2 ft. inclusive	.25
Cutting to lengths, under 2 ft. to 1 ft. inclusive	.50
Cutting to lengths, under 1 ft.	1.55

No charge for cutting rectangular plates to lengths 3 ft. and over.

Structural Material.—I-beams, 3 to 15 in.; channels, 3 to 15 in.; angles, 3 to 6 in. on one or both legs, ¼ in. thick and over, and zees, 3 in. and over, 1.15c. Extras on other shapes and sizes are as follows:

	Cents per lb.
I-beams over 15 in.	.10
H-beams over 18 in.	.10
Angles over 6 in., on one or both legs	.10
Angles, 3 in. on one or both legs less than ¼ in. thick as per steel bar card, Sept. 1, 1909	.70
Tees, structural sizes (except elevator, handrail, car truck and conductor rail)	.05
Channels and tees, under 3 in. wide, as per steel bar card, Sept. 1, 1909	.20 to .80
Deck beams and bulb angles	.30
Handrail tees	.75
Cutting to lengths, under 3 ft. to 2 ft. inclusive	.25
Cutting to lengths, under 2 ft. to 1 ft. inclusive	.50
Cutting to lengths, under 1 ft.	1.55

No charge for cutting to lengths 3 ft. and over.

Wire Products.—Fence wire, Nos. 0 to 9, per 100 lb., terms 60 days or 2 per cent. discount in 10 days, carload lots to jobbers, annealed, $1.40; galvanized, $1.90. Galvanized barb wire and fence staples to jobbers, $2.10 (erroneously printed $2.30 last week); painted, $1.60. Wire nails to jobbers, $1.60. Galvanized nails, 1 in. and longer, $1.20 advance over base price; shorter than 1 in., $1.70 advance over base price. Woven wire fencing, 72 per cent. off list for carloads; 71 off for 1000-rod lots; 70 off for less than 1000-rod lots.

The following table gives the price to retail merchants on fence wire in less than carloads, with the extras added to the base price:

Plain Wire, per 100 lb.

Nos.	0 to 9	10	11	12&12½	13	14	15	16
Annealed	$1.50	$1.55	$1.60	$1.65	$1.75	$1.85	$1.95	$2.05
Galvanized	2.00	2.05	2.10	2.15	2.25	2.35	2.75	2.85

Wire Rods.—Bessemer, open-hearth and chain rods, $25.

Wrought Pipe.—The following are the jobbers' carload discounts on the Pittsburgh basing card on steel pipe in effect from February 11, 1915, and iron pipe from February 12, 1915, all full weight:

Butt Weld

Steel: Inches	Black	Galv.	Iron: Inches	Black	Galv.
⅛, ¼ and ⅜	73	52½	⅛ and ¼	66	47
½	77	65½	⅜	65	44
¾ to 3	80	69½	½	69	54
			¾ to 2½	72	59

Lap Weld

2	77	66½	1¼	56	43
2½ to 6	79	68½	1½	67	54
7 to 12	77	66½	2	68	56
13 and 14	63½	..	2½ to 4	70	59
15	61	..	4½ to 6	70	59
			7 to 12	68	58

Reamed and Drifted

1 to 3, butt	78	67½	1 to 1½, butt	70	57
2, lap	75	64½	2, butt	70	57
2½ to 6, lap	77	66½	1¼, lap	54	41
			1½, lap	65	52
			2, lap	66	54
			2½ to 4, lap	68	57

Butt Weld, extra strong, plain ends

⅛, ¼ and ⅜	68	55½	⅜	63	50
½	73	64½	½	67	58
¾ to 1½	77	68½	¾ to 1½	71	60
2 to 3	78	69½	2 and 2½	72	61

Lap Weld, extra strong, plain ends

2	74	62½	1½	65	55
2½ to 4	76	65½	2	66	57
4½ to 6	75	64½	2½ to 4	70	59
7 to 8	69	58½	4½ to 6	69	58
9 to 12	64	53½	7 to 8	63	53
			9 to 12	58	47

Butt Weld, double extra strong, plain ends

½	63	54½	½	57	47
¾ to 1½	66	57½	¾ to 1½	60	50
2 to 2½	68	59½	2 and 2½	62	52

Lap Weld, double extra strong, plain ends

2	64	55½	2	58	47
2½ to 4	66	57½	2½ to 4	60	52
4½ to 6	65	56½	4½ to 6	59	51
7 to 8	59	48½	7 to 8	52	42

To the large jobbing trade an additional 5 per cent. is allowed over the above discounts.

The above discounts are subject to the usual variation in weight of 5 per cent. Prices for less than carloads are two (2) points lower basing (higher price) than the above discounts on black and three (3) points on galvanized.

Boiler Tubes.—Discounts to jobbers, in carloads, in effect from May 1, 1914, on steel and from January 2, 1914, on iron, are as follows:

Lap Welded Steel		*Standard Charcoal Iron*	
1¾ and 2 in.	62	1½ in.	45
2¼ in.	59	1¾ and 2 in.	49
2½ and 2¾ in.	65	2¼ in.	45
3 and 3¼ in.	70	2½ and 2¾ in.	54
3½ and 4½ in.	72	3 and 3¼ in.	57
5 and 6 in.	65	3½ and 4½ in.	60
7 to 13 in.	62	5 and 6 in.	49

Locomotive and steamship special charcoal grades bring higher prices.

2½ in. and smaller, over 18 ft., 10 per cent. net extra.

2¾ in. and larger, over 22 ft., 10 per cent. net extra.

Less than carloads will be sold at the delivered discounts for carloads, lowered by two points for lengths 22 ft. and under to destinations east of the Mississippi River; lengths over 22 ft., and all shipments going west of the Mississippi River, must be sold f.o.b. mill at Pittsburgh basing discount, lowered by two points. On standard charcoal iron tubes for desirable orders the above discounts are shaded an extra 5, and occasionally two 5's by some makers.

Sheets.—Makers' prices for mill shipment on sheets of U. S. Standard gauge, in carload and larger lots, on which jobbers charge the usual advance for small lots

from store, are as follows, f.o.b. Pittsburgh, terms 30 days net, or 2 per cent. cash discount in 10 days from date of invoice:

Blue Annealed Sheets

	Cents per lb.
Nos. 3 to 8	1.25 to 1.30
Nos. 9 to 10	1.30 to 1.35
Nos. 11 and 12	1.35 to 1.40
Nos. 13 and 14	1.45 to 1.50
Nos. 15 and 16	1.55 to 1.60

Box Annealed Sheets, Cold Rolled

	Cents per lb.
Nos. 10 and 11	1.45 to 1.50
No. 12	1.45 to 1.50
Nos. 13 and 14	1.50 to 1.55
Nos. 15 and 16	1.55 to 1.60
Nos. 17 to 21	1.60 to 1.65
Nos. 22 and 24	1.65 to 1.70
Nos. 25 and 26	1.70 to 1.75
No. 27	1.75 to 1.80
No. 28	1.80 to 1.85
No. 29	1.85 to 1.90
No. 30	1.95 to 2.00

Galvanized Sheets of Black Sheet Gauge

	Cents per lb.
Nos. 10 and 11	2.40
No. 12	2.50
Nos. 13 and 14	2.50
Nos. 15 and 16	2.65
Nos. 17 to 21	2.80
Nos. 22 and 24	2.95
Nos. 25 and 26	3.10
No. 27	3.25
No. 28	3.40
No. 29	3.55
No. 30	3.70

Pittsburgh

PITTSBURGH, PA., March 23, 1915.

The past week made a better record in the steel trade than the week before, and it is believed that specifications the remainder of the month will be heavy. In December and early January large contracts for plates, shapes and bars were placed for first quarter delivery at 1.05c. to 1.10c., and as these contracts now look good, consumers are specifying freely against them. Shipments of steel products in March by the mills will be the largest in any one month for a long time. The numerous orders for steamships placed with the shipbuilders and the large contracts for line pipe taken by the National Tube Company some time ago have helped plate business materially. Structural steel is dull, but sheets, tin plate and especially barb wire are very active. There is no doubt that the amount of foreign business coming here is larger than generally supposed. Unofficial reports are that the Steel Corporation is taking more foreign business than for a very long period, and most of this is coming to its Pittsburgh mills that make rails, tin plate, sheets and barb wire. The pig-iron market continues dull, but there has been some activity in sheet bars, several large sales having been made for second quarter, and prices are slightly higher. The coke trade is quiet, and the scrap trade halts.

Pig Iron.—W. P. Snyder & Co. of this city shipped last week 500 tons of iron to Italy and have orders for a much larger amount, but have not yet been able to secure boat space to ship it. This iron is made by the Shenango Furnace Company, Sharpsville, Pa., and has about the Bessemer limits in phosphorus and sulphur, but runs high in silicon, this latter being specified by the buyer. The company expects to ship 2000 tons or more to Italy as soon as bottoms can be secured. The Pennsylvania Railroad has bought 3000 to 4000 tons of coke foundry iron and about 1500 tons of charcoal iron for second quarter delivery at its Altoona shops. The foundry iron was taken by central and western Pennsylvania furnaces and the charcoal iron by Eastern furnaces. A sale of 300 to 400 tons of Bessemer iron for April and May shipment is reported at $13.60, Valley furnace. Not enough pig iron is being sold to fix market values. Nominal prices are as follows: Bessemer iron, $13.60; basic, $12.50; malleable Bessemer, $12.75; No. 2 foundry, $13 to $13.25, and gray forge, $12.50, all at Valley furnace, with a freight rate of 95c. a ton for delivery in the Cleveland and Pittsburgh districts.

Billets and Sheet Bars.—Up to Tuesday, March 23, the billet and rail sales bureau of the Carnegie Steel Company sent orders to the mills for rolling for 20,000 tons more of its products than in the same time in February. Some contracts have been placed for sheet bars for second quarter delivery, and prices on billets and bars are about 50c. a ton higher. A sale of 6000 tons of Bessemer sheet bars has been made at $21, Pittsburgh, for April-June shipment, and another sale of 9000 tons at the same price and for the same deliveries. A sale of 300 tons of small Bessemer billets has been made at $21, and 400 to 500 tons for forging billets in base sizes and carbons at $25, Pittsburgh. We quote Bessemer and open-hearth billets at $19, and Bessemer and open-hearth sheet bars, $19.50, f.o.b. maker's mill, Youngstown; Bessemer and open-hearth billets, $20, and Bessemer and open-hearth sheet bars, $21, f.o.b. maker's mill, Pittsburgh. Forging billets are quoted at $25 for sizes up to but not including 10 x 10 in., and for carbons up to 0.25, the regular extras being charged for larger sizes and higher carbons. Forging billets running above 0.25 to 0.60 carbon take $1 per ton extra. Axle billets are quoted at $21 to $22.

Ferroalloys.—The report that the Carnegie Steel Company is an active seller of ferromanganese is incorrect. It has sold a few small lots at $100 per ton, Pittsburgh, to consumers who were badly in need of the material, but made these sales simply to help them out. There is not much new inquiry, as consumers seem to be covered for some time ahead. The nominal price of English 80 per cent. is $78, seaboard, this price being subject to the embargo. Prices on low percentages of ferrosilicon have been reduced. We quote 50 per cent. ferrosilicon, in lots up to 100 tons, at $73; over 100 tons to 600 tons, $72; over 600 tons, $71; delivered in the Pittsburgh district. On 10 per cent. ferrosilicon the quotation is $17; 11 per cent., $18, and 12 per cent., $19, f.o.b. cars Jackson County, Ohio, or Ashland, Ky., furnace. We quote 20 per cent. spiegeleisen at $25 at furnace. We quote ferrotitanium at 8c. per lb. in carloads, 10c. in 2000-lb. lots and over, and 12½c. in less than 2000-lb. lots.

Steel Rails.—No important orders for standard sections are being placed, and it is not yet known when the Pennsylvania Railroad order will come out. The new demand for light rails is active, the Carnegie Steel Company having received orders and specifications the past week for about 6000 tons. We quote standard section rails made of Bessemer stock at 1.25c., and of open-hearth 1.34c., f.o.b. Pittsburgh. We quote light rails as follows, in carload lots: 8 and 10 lb. section, 1.275c.; 12 and 14 lb., 1.225c.; 16 and 20 lb., 1.175c.; 25, 30, 35, 40 and 45 lb. sections, 1.125c. The above prices on light rails are sometimes cut $1 per ton or more by the rerolling rail mills.

Structural Material.—Inquiry is light and the outlook for the near future is not encouraging. The McClintic-Marshall Company has taken 430 tons for additions to the School of Applied Design at Carnegie Institute and 400 tons for entrance pier to dock No. 1 at the Panama Canal. Plans are being made for the Frick Arcade building in this city, to take about 9000 tons. The Baltimore & Ohio Railroad bridge crossing the Allegheny River in this city, still pending, calls for about 12,000 tons. B. F. Jones, Jr., president Jones & Laughlin Steel Company, it is reported, will erect a 10-story brick and steel office building on Ross street in this city, plans for which are being prepared by McClure & Spahr, architects. We quote beams and channels up to 15-in. at 1.15c. for March, and 1.20c. for second quarter, f.o.b. Pittsburgh.

Plates.—The demand for plates from shipbuilders and the pipe mills is heavy, but from the steel-car builders is practically nothing. The Carnegie Steel Company is furnishing about 15,000 tons of plates per week to the National Tube Company to be used for pipe for the Standard Oil Company. The shipyards are full of work, and it is estimated that 60,000 to 75,000 tons of ship plates have been placed with Pittsburgh mills in the past month or so. There is some foreign inquiry, but sales have been light. The American Car & Foundry Company has been awarded the 200 tank cars for the Prudential Oil Company. The two leading makers of plates in this city are still quot-

ing 1.15c. for March shipment, but very little business has been booked at that figure, and it is said several smaller makers would accept business at 1.10c. There have been contracts at 1.15c. for second quarter, but some of the larger consumers are still covered at 1.10c. and less for this month, and in a few cases further ahead. We continue to quote ¼-in. and heavier plates at 1.15c. for March, and 1.20c. for second quarter delivery, but on a nice order for reasonably prompt shipment a good buyer could do better.

Sheets.—Last week shipments and orders received by the American Sheet & Tin Plate Company for hot sheet and tin mill products were the largest in any one week for some months. Specifications for high grade sheets from automobile concerns continue heavy, and there is still a good deal of foreign inquiry, with some sales. Most mills are still quoting 3.40c. for No. 28 galvanized, but there has been little new buying at this price, and on a desirable order for No. 22 or heavier probably 3.25c. could be done. Some of the jobbers who have stocks of galvanized sheets bought at 2.75c. and higher are shading the prices named by the mills. Spelter has declined nearly 3c. per lb. from the high figure reached, and it is not believed there will be any further advance in galvanized sheets. Operations of the mills are running from 60 to 75 per cent., and in some cases heavier. We quote No. 28 Bessemer black sheets at 1.80c. to 1.85c., No. 28 galvanized at 3.40c., Nos. 9 and 10 blue annealed sheets, 1.30c. to 1.35c.; No. 30 black plate, tin-mill sizes, H. R. & A., 1.95c.; No. 28, 1.90c.; Nos 27, 26 and 25, 1.85c.; Nos. 22 to 24, 1.80c.; Nos. 17 to 21, 1.75c.; Nos. 15 and 16, 1.70c. The above prices are for carload lots, f.o.b. at maker's mill, jobbers charging the usual advances for small lots from store.

Tin Plate.—Foreign inquiry is quite heavy. The American Sheet & Tin Plate Company has sold 70,000 boxes of bright plate to China, and also two lots of 20,000 boxes each, one to Japan and the other to a destination not known here. Smaller lots of tin plate are also being sold for export. The Jones & Laughlin Steel Company has started eight more mills at Aliquippa, and all of its 32 mills are now running. Specifications are active. Very little new domestic business is being placed. As a rule the mills are quoting $3.35 for 14 x 20 coke plates, but if a nice order came along this price would be shaded.

Wire Rods.—A local interest has sold 3000 tons of open-hearth wire rods for shipment to France and another maker 1200 tons for delivery to an unknown destination. The American Steel & Wire Company is making heavy shipments of wire rods abroad. The output of several of the leading wire rod mills in March will be the heaviest of any one month for a long time. Domestic demand is dull, as consumers are covered, but specifications are fair. We quote Bessemer, open-hearth and chain rods at $25 to $25.50, f.o.b. Pittsburgh, but for small lots for prompt shipment it is said that as high as $26 has been done.

Steel Carwheels.—No new inquiries are out, as no orders of moment for steel cars have been placed for some time. We quote standard 33-in. freight carwheels, 6¼-in. rough bore, at $15, and standard 36-in. passenger, the same bore, at $21 per wheel, f.o.b. Pittsburgh.

Shafting.—Makers report that the trade is taking very well to the new discounts and new list of extras effective March 15. Specifications are fairly active, but from the automobile trade are not so heavy as they have been. The implement makers have not been specifying very freely for a long time. We quote cold-rolled shafting at 70 per cent. off in carloads and larger lots, and 65 per cent. on small lots, f.o.b. Pittsburgh, freight to destination added.

Railroad Spikes.—About three months ago the New York, New Haven & Hartford Railroad sent out an inquiry for 15,000 kegs of spikes, but to this time this has not been closed. Specifications are now coming in from the railroads and quite heavy shipments are expected to start in April. We quote standard railroad spikes at $1.35 to $1.40, and small spikes at $1.45 to $1.50 in carload and larger lots, f.o.b. Pittsburgh.

Skelp.—Some foreign inquiry has come up recently and several fairly large lots of grooved steel skelp are under negotiation. The domestic demand is slightly better and prices are firm but no higher. We quote grooved steel skelp, 1.10c. to 1.15c.; sheared steel skelp, 1.15c. to 1.20c.; grooved iron skelp, 1.50c.; sheared iron skelp, 1.50c. to 1.60c., delivered to consumers' mills in the Pittsburgh district.

Hoops and Bands.—New buying is only fair and mostly in small lots, as consumers are covered to April, and in some cases through second quarter. Mills report specifications are moderate in volume. We quote steel bands at 1.15c. for March delivery and 1.20c. for second quarter, with extras as per the steel bar card. Prices on steel hoops are firm at 1.25c. to 1.30c. at mill.

Wire Products.—As yet the American Steel & Wire Company seems to be alone in its action in advancing the extras on galvanized wire products $2 a ton last week. Several large makers have not yet followed this advance, in view of the fact that prices on spelter have sharply declined recently. The foreign demand for barb wire is very heavy, and it is stated one large interest closed the past week for 25,000 tons or more. Another interest reports that it has sold 10,000 to 12,000 tons of barb wire for export. The output of wire by several of the leading companies in March will be the heaviest in any one month for a long time. The new domestic demand for wire and wire nails is quiet, as consumers are covered by contracts placed in December and January at lower prices than are ruling now. Specifications against these contracts are very active. Mills quote on new orders as follows: Wire nails, $1.60; galvanized nails 1 in. and shorter taking an advance of $1.70 over this price, or $3.30, and galvanized nails, 1 in. and longer, an advance of $1.20, or $2.80; plain annealed wire, $1.40; galvanized barb wire and fence staples, $2.10 to $2.20; painted barb wire, $1.60, all f.o.b. Pittsburgh, freight added to point of delivery, terms 30 days net, less 2 per cent. for cash in 10 days. We quote woven wire fencing at 72 per cent. off in carload lots, 71 per cent. off on 1000-rod lots and 70 per cent. on small lots, f.o.b Pittsburgh.

Iron and Steel Bars.—The new demand for steel bars is active and mills state that quite a good business was placed at the 1.15c. price for March shipment. Specifications against contracts placed several months ago at 1.05c. and 1.10c. are coming in freely, and shipments of steel bars in March will be the heaviest in any one month for a long time. The demand for steel bars for reinforcing purposes is stronger. As yet the demand for common iron bars does not show much betterment. We quote steel bars for March shipment at 1.15c. and for second quarter 1.20c., f.o.b. Pittsburgh. Common iron bars, made from part scrap, are 1.10c. to 1.15c., maker's mill.

Merchant Steel.—Mills report the new demand slightly better and shipments in March will show quite an increase over any month for some time. Prices are firmer and on small lots are as follows: Iron finished tire, ½ x 1½ in. and larger, 1.30c. base; under ½ x 1½ in., 1.45c.; planished tire, 1.50c.; channel tire, ¾ to ⅞ and 1 in., 1.80c. to 1.90c.; 1⅛ in. and larger, 1.90c.; toe calk, 1.90c. to 2c., base; flat sleigh shoe, 1.65c.; concave and convex, 1.70c.; cutter shoe, tapered or bent, 2.20c. to 2.30c.; spring steel, 1.90c. to 2c.; machinery steel, smooth finish, 1.70c.

Cold-Rolled Strip Steel.—The new demand is fair, but most consumers are covered on contracts placed some time ago. Specifications are coming in quite freely. We quote hard-rolled steel, 1½ in. and wider, under 0.20 carbon, sheared or natural mill edges, per 100 lb., $2.75 delivered. Extras, which are standard among all the mills, are as follows:

Thickness, in.	Extras for thickness	Extras for soft or intermediate tempers	Extras for straightening and cutting to lengths not less than 24 in.
0.100 and heavier	Base	$0.25	$0.10
0.099 to 0.050	$0.05	0.25	0.15
0.049 to 0.035	0.20	0.35	0.15
0.034 to 0.031	0.35	0.40	0.25
0.030 to 0.025	0.45	0.40	0.40
0.024 to 0.020	0.55	0.40	0.50
0.019 to 0.017	0.85	0.50	1.10
0.016 to 0.015	1.25	0.50	1.10
0.014 to 0.013	1.95	0.50	1.25
0.012	2.30	0.50	coils only
0.011	2.65	0.50	coils only
0.010	3.00	0.50	coils only

Wrought Pipe.—Mills are now operating to a larger rate of capacity, ranging from 60 to 75 per cent., and the new demand is getting heavier. A contract for about 4000 tons of 12-in. pipe for a waterworks in a Western city has been placed with a local mill. The Philadelphia Company has placed with three mills its requirements for this year, about 3000 tons, being less than half of last year's purchases. Discounts on iron and steel pipe are being firmly held.

Boiler Tubes.—There is no betterment in the demand for locomotive or merchant tubes. Discounts are still shaded.

Coke.—An Eastern consumer is in the market for 10,000 to 12,000 tons of furnace coke per month, running over the next six months. Prices are not very strong. It is reported that furnace coke has been sold recently for delivery over the remainder of the year at less than $1.75 per net ton at oven. There is very little demand for foundry coke. The Connellsville Courier reports the output of coke in the upper and lower Connellsville regions for the week ended March 13 as 279,727 tons, an increase over the previous week of 5075 tons. We quote standard makes of blast-furnace coke for prompt shipments from $1.50 to $1.60; on contracts for delivery up to July 1, $1.65, and for delivery over all of 1915, at $1.75 per net ton at oven.

Old Material.—Little scrap is moving from dealers to consumers, as the latter are not willing to pay the prices asked. As no scrap is pressing on the market prices are firm. Sales of 1500 to 2000 tons of heavy steel scrap are reported to have been sold for delivery at Monessen, Pa., at $12.25 to $12.50 per gross ton. We also note sales of 800 to 1000 tons of turnings at $8 to $8.25, and 1000 tons of borings at $8.25 to $8.50, delivered. For delivery in Pittsburgh and nearby districts that take Pittsburgh freights, dealers quote about as follows:

Heavy steel melting scrap, Steubenville, Follansbee, Brackenridge, Sharon, Monessen, Midland and Pittsburgh delivery	$12.00 to $12.25
Compressed side and end sheet scrap	10.25 to 10.50
No. 1 foundry cast	12.00 to 12.25
Bundled sheet scrap, f.o.b. consumers' mills, Pittsburgh district	9.25 to 9.50
Rerolling rails, Newark and Cambridge, Ohio, Cumberland, Md., and Franklin, Pa.	11.75 to 12.00
No. 1 railroad malleable stock	10.00 to 10.25
Railroad grate bars	8.50 to 8.75
Low phosphorus melting stock	13.25 to 13.50
Iron car axles	18.75 to 19.25
Steel car axles	13.25 to 13.75
Locomotive axles, steel	19.75 to 20.25
No. 1 busheling scrap	9.75 to 10.00
No. 2 busheling scrap	7.00 to 7.25
Machine shop turnings	8.00 to 8.25
Old carwheels	10.75 to 11.00
Cast-iron borings	8.25 to 8.50
*Sheet bar crop ends	12.00 to 12.25
Old iron rails	12.75 to 13.00
No. 1 railroad wrought scrap	10.75 to 11.00
Heavy steel axle turnings	8.50 to 8.75
Heavy breakable cast scrap	10.75 to 11.00

*Shipping point.

Chicago

CHICAGO, ILL., March 23, 1915.

The market situation is most easily likened to a checkerboard of light and dark spots with the general color scheme a mild shade of blue. With some of the local mills and sales offices, the past week has been almost devoid of new orders, while other reports indicate the taking of new business on a scale in excess of the present 60 to 65 per cent. operating rate of the mills of this district. The sales, specifications and shipments of the mills of the leading interest in this territory show a steady increase, and one of the Eastern steel companies booked, in this market, a normal week's tonnage, made up largely of wire products and structural shapes. An order for 2000 tons of rails for immediate shipment to the Northwest was the largest rail transaction, while of plates and bars, orders previously taken for shipment to the Orient and amounting to an aggregate of 7000 tons, were increased by additional specifications for 15,000 tons for export. Other business for foreign delivery includes 4000 kegs of screw spikes for Italy. Mill orders for structural material, except for 1100 tons taken by the Cambria Steel Company, were of little importance. Prices of the principal steel products, with the possible exception of plates, show no deviation from the accepted basis of 1.15c., Pittsburgh. Bars, both iron and steel, are in very limited demand, the most interesting feature being the advance in the price of iron bars to 1.15c. The movement in wire is well sustained and more nearly approaches normal than does the buying of steel in any other form. Pig iron inquiry is exceedingly limited, and trading lacks animation. In the scrap market consumers' demand is at a minimum.

Pig Iron.—Interest in pig iron is very limited indeed, and such transactions as have been completed have little significance, either for present or future consideration. There has been some buying of a miscellaneous character, but one lot of as much as 1000 tons being reported. In addition to this purchase of Northern iron, there is some inquiry for malleable, the price of which is open to a little more suspicion as to the firmness with which it is held than are other foundry grades. A number of sales of Southern iron, aggregating about 2000 tons, have been made, the price running uniformly at $9.50, Birmingham. The following quotations are for iron delivered at consumers' yards, except those for Northern foundry, malleable Bessemer and basic iron, which are f.o.b. furnace, and do not include a switching charge averaging 50c. a ton:

Lake Superior charcoal, Nos. 2 to 5	$15.75
Lake Superior charcoal, No. 1	16.25
Lake Superior charcoal, No. 6 and Scotch	16.75
Northern coke foundry, No. 1	$13.25 to 13.50
Northern coke foundry, No. 2	13.00 to 13.25
Northern coke foundry, No. 3	12.50 to 13.00
Southern coke, No. 1 f'dry and 1 soft	13.75 to 14.25
Southern coke, No. 2 f'dry and 2 soft	13.50 to 13.75
Malleable Bessemer	13.00 to 13.25
Standard Bessemer	15.50
Basic	12.50 to 13.00
Low phosphorus	20.00 to 20.50
Jackson Co. and Ky. silvery, 6 per cent.	16.90 to 17.40
Jackson Co. and Ky. silvery, 8 per cent.	17.90 to 18.40
Jackson Co. and Ky. silv'y, 10 per cent.	18.90 to 19.40

Rails and Track Supplies.—The Great Northern railroad has placed a further order for 2000 tons of rails for immediate rolling. A few rail orders of smaller tonnage were also booked, while among sales of track fastenings, one of 2200 kegs of spikes is noted. An interesting order for export calls for the delivery of 4000 kegs of screw spikes to Italy. Prices for track fastenings continue very soft, the extreme concessions appearing in connection with business taken for eastern manufacture and western delivery. We quote standard railroad spikes at 1.45c. to 1.50c., base; track bolts with square nuts, 1.90c., base, all in carload lots, Chicago; tie plates, $23.50 to $25, f.o.b. mill, net ton; standard section Bessemer rails, Chicago, 1.25c., base; open-hearth, 1.34c.; light rails, 25 to 45 lb., 1.07c.; 16 to 20 lb., 1.12c.; 12 lb., 1.17c.; 8 lb., 1.22c.; angle bars, 1.50c., Chicago.

Structural Material.—The Wabash Railroad has ordered about 700 tons of I-beam spans from the Decatur Bridge Company, the steel to be rolled by the Cambria Steel Company, which will also furnish about 500 tons of shapes for a hotel building in the Northwest. Other railroad inquiry for bridge steel includes 1300 tons for the Burlington, 500 tons for the St. Paul and 400 tons for the Great Northern. The Morava Construction Company, Chicago, will fabricate 368 tons for the foundry and erecting shop of the Zimmerman Steel Company at Bettendorf, Ia., the price for the steel, erected, being reported as under $50 a ton. The Central Missouri Trust Company, Jefferson City, Mo., has placed 249 tons for a bank building with Christopher & Simpson, the Union Iron Works is building a crane runway, for which the Ralston Iron Works will furnish 700 tons, while 420 tons for a steel shed at Richmond, Cal., goes to the Pacific Rolling Mill Company. The mill situation offers little occasion for comment and we continue to quote for Chicago delivery of plain material from mill 1.339c.

Demand for structural shapes from store has failed to improve in proportion to inquiry for lighter products. Prices are unchanged and we quote for delivery out of stock at Chicago 1.75c.

Plates.—Plate mill operations among the independent makers selling in this market is largely sustained by the demand for plates for oil tank construction in the Southwest. Export orders for Japan, consisting largely of plates, have now been brought up to an aggregate of 22,000 tons through the placing this week of specifications for an additional 15,000 tons. The Missouri, Kansas & Texas Railroad has purchased from the American Locomotive Company the 40 locomotives for which it was inquiring, the Grand Trunk Railroad expects to buy 60 tank cars, and a Colorado road is in the market for 200 freight cars. There are evidences that for plates, within a limited range of sizes, 1.10c., Pittsburgh, or an equivalent price, can be done. We quote for Chicago delivery of plates from mill 1.289c. to 1.339c.

We quote for Chicago delivery of plates out of stock 1.75c.

Sheets.—Although there has been very little relief for the spelter situation, makers of galvanized sheets have been receiving consignments ordered some time ago for March delivery, and they are now selling limited quantities of galvanized, on mixed specifications, where previously all business in galvanized sheets was declined. Mill operations in sheets run to approximately 65 per cent. of capacity. We quote for Chicago delivery from mill: No. 10 blue annealed, 1.489c. to 1.539c.; No. 28 black, 1.939c. to 1.989c.; No. 28 galvanized, 3.589c.

In the lighter products, principally sheets, store trade shows increasing briskness and reports of a further advance in galvanized sheet quotations are current. We quote for Chicago delivery from jobbers' stocks as follows, minimum prices applying on bundles of 25 or more: No. 10 blue annealed, 1.95c.; No. 28 black, 2.55c.; No. 28 galvanized, 3.65c. to 3.75c.

Bars.—The bar market of last week affords occasion for but very limited comment. There is little new business in steel bars, although specifications are fair. Bar-iron tonnage is light but seems to come in steadily, the Inland mill at East Chicago having accumulated a sufficient tonnage to resume after a week's shut-down. The course of the bar-iron market, with respect to price, has been interesting because of the advance of about $2 a ton within the past few weeks in the face of a very limited offering of business. We quote for mill shipments as follows: Bar iron, 1.12½c. to 1.15c.; soft steel bars, 1.339c.; hard steel bars, 1.20c.; shafting in carloads, 65 to 68 per cent. off; less than carloads, 60 to 65 per cent. off.

We quote store prices for Chicago delivery: Soft steel bars, 1.65c.; bar iron, 1.65c.; reinforcing bars, 1.65c. base, with 5c. extra for twisting in sizes ½ in. and over and usual card extras for smaller sizes; shafting 62 per cent. off.

Rivets and Bolts.—The market for the time being presents little of a disturbing nature. There is very little business being placed, outside of contracts already in force. Our quotations are as follows: Carriage bolts up to ⅝ x 6 in., rolled thread, 80-20; cut thread, 80-15; larger sizes, 80; machine bolts up to ⅝ x 4 in., rolled thread, 80-25; cut thread, 80-20; larger sizes, 80-5; coach screws, 85-5; hot pressed nuts, square, $6.80 to $6.60 off per cwt.; hexagon, $7.80 to $7.60 off per cwt. Structural rivets, ¾ to 1¼ in., 1.50c. to 1.55c., base, Chicago, in carload lots; boiler rivets, 10c., additional.

We quote out of store: Structural rivets, 2c.; boiler rivets, 2.10c.; machine bolts up to ¾ x 4 in., 75-15; larger sizes, 70-10-10; carriage bolts up to ¾ x 6 in., 75-10; larger sizes, 70-15 off; hot pressed nuts, square, $6, and hexagon, $6.70 off per cwt.

Wire Products.—While there seems to be a slight falling off in the demand for wire nails, probably due to the fact that dealers' stocks are now well filled, the specifying of barb wire and fencing continues at a very healthy rate. We quote to jobbers as follows: Plain wire, No. 9 and coarser, base, $1.589; wire nails, $1.789; painted barb wire, $1.789; galvanized barb wire, $2.289 to $2.389; polished staples, $1.789; galvanized staples, $2.289 to $2.389, all Chicago.

Cast Iron Pipe.—The leading interest has received contracts for 1200 tons of pipe for Duluth and 2500 tons for Akron, Ohio. An interesting feature of the 13,000-ton contract at Cleveland is the proportion of pipe of large size, about 9000 tons being 30, 36, 42 and 48 inches in diameter. Contracts for gas pipe in this territory are now generally closed. We quote as follows, per net ton, Chicago: Water pipe, 4 in., $25.50; 6 to 12 in., $23.50; 16 in. and up, $23, with $1 extra for gas pipe.

Old Material.—The dullness of the scrap market is accentuated, and the lower prices being quoted on nearly all grades indicate the weakness of the situation. The over-supply of old material is this week augmented by railroad lists totaling over 9000 tons, including 1300 tons from the St. Paul, 2700 tons from the Burlington, 1600 tons from the Great Northern and 3600 tons from the Illinois Central, the last named list offering 2000 tons of carwheels. We quote for delivery at buyers' works, Chicago and vicinity, all freight and transfer charges paid, as follows:

Per Gross Ton	
Old iron rails	$12.00 to $12.25
Old steel rails, rerolling	10.25 to 10.75
Old steel rails, less than 3 ft.	10.00 to 10.50
Old carwheels	9.75 to 10.00
Heavy melting steel scrap	9.25 to 9.75
Frogs, switches and guards, cut apart	9.25 to 9.75
Shoveling steel	9.00 to 9.25
Steel axle turnings	7.00 to 7.50

Per Net Ton	
Iron angles and splice bars	$11.50 to $12.00
Iron arch bars and transoms	11.75 to 12.25
Steel angle bars	8.50 to 9.00
Iron car axles	13.75 to 14.25
Steel car axles	11.25 to 11.75
No. 1 railroad wrought	9.00 to 9.25
No. 2 railroad wrought	8.50 to 8.75
Cut forge	8.50 to 8.75
Steel knuckles and couplers	8.50 to 9.00
Steel springs	9.00 to 9.50
Locomotive tires, smooth	8.50 to 9.00
Machine shop turnings	5.50 to 5.75
Cast borings	4.75 to 5.25
No. 1 busheling	8.00 to 8.25
No. 2 busheling	7.00 to 7.25
No. 1 boilers, cut to sheets and rings	5.50 to 6.00
Boiler punchings	8.25 to 8.50
No. 1 cast scrap	9.00 to 9.25
Stove plate and light cast scrap	8.00 to 8.25
Grate bars	7.75 to 8.00
Railroad malleable	8.00 to 8.50
Agricultural malleable	7.25 to 7.50
Pipes and flues	6.75 to 7.25

Philadelphia

PHILADELPHIA, PA., March 23, 1915.

The situation has changed but little so far as domestic demand goes. The most encouraging feature of the market is the steady increase in exports of finished steel products, including light rails, rods, fencing, barb wire, shrapnel steel, etc. A recent inquiry from abroad for barb wire calls for 5000 tons a month until ordered stopped. Ocean freights continue high at around 60s. ($14.60), against approximately 25s. ($6.09) ordinarily, although cargo space is easier to obtain. It is noticeable that the companies which are doing best in the export business are those having in their employ men who are thoroughly familiar with foreign languages, foreign trade customs and foreign requirements. Inquiries have been received which are practically unintelligible to those well versed in the home trade, but these same inquiries are reasonably clear to the man trained abroad, indicating that something more than mere knowledge of a foreign language is required. Some good orders have been taken for steel from which shrapnel is to be manufactured in this country. Makers of finished steel products are still disinclined to sell far ahead except in the case of the agricultural implement makers. The demand for structural material does not appear to be as good in the East as it is in the West and its prices, like those for plates, are subject to shading. The demand for sheets and billets continues poor. Pig iron is moving in small quantities only, and there are evidences of weakness at Buffalo and Birmingham. High prices are the rule for small quantities of ferromanganese. Heavy melting steel is firmer.

Iron Ore.—It is obvious that the demand for ore cannot improve until the consumption of pig iron increases. The local customs house reports an arrival of 2638 tons from Egypt.

Pig Iron.—The Pennsylvania Railroad Company has placed orders for its requirements of coke and charcoal pig iron which were referred to a week ago. Aside from this buying there have been no transactions of noteworthy size. There has been no actual change in the prices quoted for this district, but a certain amount of weakness is evident in both Buffalo and Birmingham irons. The Lackawanna Railroad Company is reported to be about ready to contract with Buffalo furnaces for 3000 tons of foundry grades. There is an inquiry in the market for export to Japan but no one seems to know much about it. A few sample shipments of low phosphorus have been made to England, and sellers are regarding these hopefully as they believe that when the quality of the iron is demonstrated it may lead to a permanent business with English and other foreign consumers. The piling of low phosphorus at furnaces continues. Southern iron has been extremely quiet. Transactions in Southern iron totaled in the case of one maker about 1500 tons, the sales being on a par with those of the preceding week. Quotations for standard brands for early delivery in buyers' yards in this district are as follows:

Eastern Penna. No. 2 X foundry	$14.25 to $14.50
Eastern Penna. No. 2 plain	14.00 to 14.25
Virginia No. 2 X foundry	15.25
Virginia No. 2 plain	15.00
Gray forge	13.25 to 13.50
Basic	13.50
Standard low phosphorus	20.00 to 20.50

Ferroalloys.—Inquiries from the smaller consumers of 80 per cent. ferromanganese are increasing. In the past few days 6¾c. per lb. has been paid for 5-ton lots, either ground or lump, and 7c. for 1-ton lots. At present, anxiety over the question of supply seems to be almost entirely with foundries and crucible steel makers who use comparatively small quantities. No information is available here as to conditions abroad. The nominal quotation for large lots continues at $78, seaboard. For 50 per cent. ferrosilicon $71 to $73, Pittsburgh, continues to be quoted.

Bars.—With some companies a betterment is shown over the business of the preceding week, while with others both specifications and inquiries were lighter. It is generally understood that April 1 the quotation for steel bars for prompt delivery will be advanced to 1.20c., Pittsburgh, or 1.359c., Philadelphia. Iron bars are unchanged at 1.15c. to 1.20c., Philadelphia, though for some grades, 1.05c., mill, or 1.129c., Philadelphia, can be done.

Plates.—Mills which specialize in plates had a poor week as regards new business. All of the orders were small and miscellaneous and there is but little prospect for betterment until the railroads become more active in the purchase of cars and locomotives. The inactivity of the railroads is much deplored, though it is admitted that they can hardly be expected to do better under existing conditions. Makers are still quoting 1.309c., Philadelphia, for prompt delivery, and it is more freely paid. At the same time there is no question but that in some quarters plates can be obtained for less. A few small lots have been sold for export and with the advancing prices abroad for this class of material it is hoped that a helpful volume of such sales will develop.

Rails.—Some good-sized orders have been placed, or are on the point of being closed, for light rails for export to France, Russia, South America and South Africa. In some cases the rails include steel ties, etc. The domestic demand presents little to talk about. The Pennsylvania Steel Company has received orders for 650 tons of T rails and 500 tons of girder rails. The purchasers are not announced.

Structural Material.—No new projects have come out, but the demand for plain material is keeping up with that of the preceding week and mill representatives are somewhat encouraged, despite the fact that prices are low. Some orders have been taken at 1.309c., Philadelphia, and there is talk of $1 per ton more on prompt business after April 1, but at this time it is certain that 1.259c. would be taken. Local mills are figuring on about 500 tons for small bridges required by the Pennsylvania Railroad.

Sheets.—In a quiet market quotations range from 1.30c. to 1.35c., Pittsburgh, or 1.459c. to 1.509c., Philadelphia, for No. 10 blue annealed. Sellers are getting the latter price as a rule.

Billets.—The demand is no better and the quotation for basic open-hearth rolling billets is unchanged at $21.52, Philadelphia. Forging steel commands an extra of $4 per ton.

Coke.—The market shows no change from the quiet conditions of recent weeks. Standard Connellsville furnace coke is quoted at $1.50 to $1.55 per net ton at oven for prompt shipment. Prompt foundry is quoted at $2 to $2.25. Freight rates from the principal producing districts are as follows: Connellsville, $2.05; Latrobe, $1.85, and Mountain, $1.65.

Old Material.—Business has been done, though not a great deal, in heavy melting steel scrap, and it is generally reported that $11.50 has been paid by a mill whose need was urgent. More interest is shown in the market, particularly on the part of plate makers who recently took large plate orders from shipyards. Some firmness is imparted to the market by the holding of desirable material for higher prices. Small lots of machine shop turnings have been taken at what are considered good prices. The Pennsylvania Railroad recently sold between 11,000 and 12,000 tons of old steel rails. Quotations for delivery in buyers' yards in this district, covering eastern Pennsylvania and taking freight rates from 35c. to $1.35 per gross ton, are as follows:

No. 1 heavy melting steel	$11.00 to $11.50
Old steel rails, rerolling	11.00 to 11.25
Low phos. heavy melting steel scrap	14.25 to 14.50
Old steel axles	14.00 to 14.50
Old iron axles	17.50 to 18.00
Old iron rails	13.00 to 14.00
Old carwheels	11.00 to 11.50
No. 1 railroad wrought	12.50 to 13.00
Wrought-iron pipe	10.00 to 10.50
No. 1 forge fire	8.00 to 8.50
Bundled sheets	8.50 to 9.00
No. 2 busheling	7.75 to 8.25
Machine shop turnings	8.25 to 8.75
Cast borings	8.00 to 8.50
No. 1 cast	12.00 to 12.50
Grate bars, railroad	8.75 to 9.25
Stove plate	8.75 to 9.25
Railroad malleable	9.00 to 9.50

Buffalo

BUFFALO, N. Y., March 23, 1915.

Pig Iron.—Competition has led to a further reduction in prices of pig iron in this district and $12 at furnace is now obtainable on large tonnages for second and third quarter and last half delivery. A considerable buying movement has developed on this basis within the past few days and heavy sales have resulted, aggregating over 150,000 tons from the furnaces of the district. The bulk of the iron was taken by New England and New Jersey buyers, and much of it was made up of 500 to 1000 ton orders from a large number of users. Sellers report the inquiry as now more active than for a number of months. Very little attention is being paid to grades in quotations made, the range of the market being from $12 to $12.25 at furnace for good-sized tonnages, small lots commanding somewhat higher figures. The price-situation is now so clouded that we are not able to quote a definite price schedule covering the different grades and so omit it for the week. The above refers to foundry, malleable and basic coke irons. Prices on charcoal irons are unchanged, ranging from $15.75 to $17, according to grade and analysis, the minimum price applying only to direct shipments from furnace and not to shipments from storage yards or docks at Buffalo. Including the Charlotte furnace of Corrigan McKinney & Co., there are 10 merchant stacks in blast in the Buffalo district out of 12, producing over 3000 tons of pig iron per day, or a total of 90,000 to 100,000 tons per month. The steady flow of specifications coming in against iron already under contract and the heavy bookings closed up in the last few days will equalize this output for a considerable period ahead, and, it is believed, will have a tendency to shortly bring about a firming up of prices.

Finished Iron and Steel.—Specifications continue to come in in fair volume against existing contracts

and at a better rate than for the past two weeks. Bars and structural shapes are stronger in price tone than plates. Only a small aggregate of new business is reported in general finished lines, but exports from the interior of the State indicate that many building projects involving the use of concrete bars are developing. Specifications against tin-plate contracts are coming in a little more freely, due doubtless to the desire of consumers to safeguard their requirements against the present or possible future scarcity of pig tin. Steel pipe specifications continue to be large, jobbers taking out full quotas on contracts, availing themselves of the November price card which remains effective until April 1. Bids are to be taken this week on the steel for the Lehigh Valley passenger terminal at Buffalo, involving about 4000 tons. The Buffalo Structural Steel Company has received contracts for 170 tons for the Robert W. Pomeroy store and loft building, Buffalo; 135 tons for plant addition of the Fedders Mfg. Company, Buffalo, and 100 tons for addition to the plant of the Buffalo Copper & Brass Rolling Mill. The Lackawanna Bridge Company has contract for 200 tons for additions to the plant of the W. A. Case & Son Mfg. Company, Buffalo.

Old Material.—The scrap market has experienced considerable activity, more inquiries having been received than for some time, with a good volume of business resulting. Sales made included a good aggregate of heavy melting steel, a large portion of which was moved to the Pittsburgh district and turnings and borings were the other leaders in commodities dealt in. Dealers are exhibiting a willingness to sell at any price that shows an increase over recent schedules, the general impression being that conditions are not favorable for much better prices for some time. We quote dealers' asking prices, per gross ton, f.o.b. Buffalo, as follows:

Heavy melting steel	$10.50 to $10.75
Low phosphorus steel	13.00 to 13.50
No. 1 railroad wrought scrap	10.00 to 10.50
No. 1 railroad and machinery cast	10.50 to 11.00
Old steel axles	12.00 to 12.50
Old iron axles	16.00 to 16.50
Old carwheels	10.50 to 11.00
Railroad malleable	9.50 to 10.00
Machine shop turnings	5.75 to 6.25
Heavy axle turnings	8.50 to 9.00
Clean cast borings	6.50 to 7.00
Old iron rails	11.00 to 11.50
Locomotive grate bars	9.00 to 9.50
Stove plate (net ton)	8.25 to 8.75
Wrought pipe	6.50 to 7.00
Bundled sheet scrap	7.25 to 7.75
No. 1 busheling scrap	8.50 to 9.00
No. 2 busheling scrap	6.00 to 6.50
Bundled tin scrap	9.00

Cleveland

CLEVELAND, OHIO, March 23, 1915.

Iron Ore.—Shipments from Lake Erie docks show an improvement, particularly from Conneaut, where an average of 150 cars of ore per day is being sent to the furnaces. The Pittsburgh Steamship Company is planning to place some of its boats in commission in April. It is not probable that other ore shippers will begin to move cargoes until well into May. There are no signs of an early buying movement. We repeat 1914 prices as follows: Old range Bessemer, $3.75; Mesaba Bessemer, $3.50; old range non-Bessemer, $3; Mesaba non-Bessemer, $2.85.

Pig Iron.—A northern Ohio consumer has purchased 2000 tons of foundry iron for the last half at $13 at furnace for No. 2. This is the only sale of importance reported in this territory for the week. However, a Cleveland agency has sold to a leading stove interest a fair sized lot of foundry iron for shipment to its Indianapolis plant for the last half. There was keen competition for this business, which is understood to have been placed at $13.90, delivered, or $12.32 at Lake furnace for No. 2. The same interest is in the market for 1000 to 2000 tons of Northern foundry iron for its Bedford, Ohio, plant. While consumers in Indiana and some other Central Western points have been buying quite freely, few consumers in this territory are taking an interest in the last half. At present there appears to be a spread of from $12.50 to $13 in Cleveland prices for outside shipment. For local delivery No. 2 foundry can be had at $13 at furnace or 25c. lower than recent quotations. Southern iron is fairly active, a number of small lot sales being made during the week at $9.50 to $9.75 for No. 2 for the last half. The regular $15 price on silvery for 8 per cent. has been shaded slightly. We quote, delivered Cleveland, as follows:

Bessemer	$14.55
Basic	13.45
Northern No. 2 foundry	$13.25 to 13.50
Southern No. 2 foundry	13.50 to 13.75
Gray forge	13.00
Jackson Co. silvery 8 per cent. silicon	16.62
Standard low phos. at furnace	19.75 to 20.00

Finished Iron and Steel.—Orders for war material placed in the week with Cleveland manufacturers require 3500 tons of steel, which will be placed within a day or two. One of these orders will take 2000 tons of 3½-in. rounds for shrapnel shells. The same manufacturer recently placed 700 tons for the same purpose. The other order is for an industrial railroad for France, taking 900 tons of 20-lb. rails and 600 tons of steel ties. Mills are getting a fair volume of specifications, orders with some selling agencies having improved considerably over February. As first quarter contracts at 1.10c. expire next week, considerable improvement in specifications is expected within the next few days, particularly on steel bars. A large portion of the trade is covered with second quarter contracts at 1.15c., made before the advance in price to 1.20c. for that delivery. Good specifications are coming from the implement manufacturers, whose plants in this territory are now quite busy. Structural specifications have improved but no new building work has been placed and no new inquiries are pending at present. Sheet bar specifications have improved and an inquiry is pending for 5000 tons for the second quarter. The demand for black sheets is more active and prices are somewhat firmer. Owing to the part operation or complete temporary shut down of some of the Ohio mills because of labor troubles, some of the mills to fill prompt orders have purchased from other mills. Black sheets are quoted at 1.80c. to 1.85c. for No. 28, some mills having advanced their price $1 a ton. We quote galvanized sheets at 3.40c. to 3.50c. for No. 28 and blue annealed at 1.30c. to 1.35c. for No. 10. Iron bars are in light demand, but prices are firm at 1.10c. to 1.25c., Cleveland, the latter price being for local delivery. Warehouse business which recently showed an improvement is very good. Warehouse prices are 1.80c. for steel bars and 1.90c. for plates and structural material.

Bolts, Nuts and Rivets.—Bolt and nut makers have advanced prices 2½ to 5 per cent. on bolts and on some nut classifications and are now quoting one flat discount on some of the hexagon nut classifications which have been irregular. With the improved demand and higher prices for steel, bolt and nut makers feel that they should get better prices. There is good demand for small bolts but heavy bolts are not active. Rivet prices are irregular, sales being made at 1.40c. for structural and 1.50c. for boiler. A leading maker announces for the second quarter delivery its minimum price will be 1.45c. for structural and 1.55c. for boiler. New bolt and nut discounts are as follows: Common carriage bolts, ⅝ x 6 in., smaller or shorter, rolled thread 80 and 15 per cent.; cut thread 80 and 10 per cent.; larger or longer 75 and 17½ per cent.; machine bolts with h.p. nuts, ⅝ x 4 in. smaller or shorter, rolled thread, 80 and 20 per cent.; cut thread 80 and 15 per cent.; larger or longer 80 and 2½ per cent; coach and lag screws, 85 and 2½ per cent.; square h.p. nuts, blank or tapped $6.40 off; hexagon h.p. nuts, blank or tapped, $7.30 off; c.p.c. and t. square nuts, blank or tapped, $6.10 off; hexagon ⅝ in. and larger $7.60 off; 9/16 and smaller, $8.30 off; semi-finished hexagon nuts ⅝ in. and larger, 85, 10, 10 and 5 per cent.; 9/16 and smaller, 85, 10, 10, 10 and 5 per cent.

Old Material.—Scrap is moving only in small lots and the market is generally weak. With present conditions, few short sales are being made. Mahoning Valley mills are out of the market. Steel car axles have

declined, probably because of the large number thrown on the market by the railroads this month. Borings and turnings and drillings have declined 25c. a ton. Busheling, however, after a recent decline, has stiffened and local sales of 1500 tons of No. 1 new busheling are reported at $9 to $9.25. In Youngstown the price on compressed sheet scrap has declined 50c. a ton. Heavy steel scrap is quoted at $11 to $11.50 in Youngstown. Some of the mills are holding up shipments. The rolling mills of the Lake Erie Iron Company, Cleveland, which have been shut down several weeks, have started up. We quote, f.o.b. Cleveland, as follows:

Per Gross Ton

Old steel rails, rerolling	$11.00 to $11.75
Old iron rails	12.00
Steel car axles	12.75 to 13.00
Heavy melting steel	10.25 to 10.75
Old carwheels	10.25 to 10.75
Relaying rails, 50 lb. and over	22.50
Agricultural malleable	8.00 to 8.50
Railroad malleable	10.25 to 10.50
Steel axle turnings	9.00 to 9.50
Light bundled sheet scrap	8.00 to 8.50

Per Net Ton

Iron car axles	$16.00 to $16.50
Cast borings	6.00 to 6.25
Iron and steel turnings and drillings	5.50 to 5.75
No. 1 busheling new	8.75 to 9.00
No. 1 busheling old	8.50 to 8.75
No. 1 railroad wrought	10.00 to 10.25
No .1 cast	10.00 to 10.50
Stove plate	8.25 to 8.50

Cincinnati

CINCINNATI, OHIO, March 24, 1915.—(*By Wire.*)

Pig Iron.—Very little Northern or Southern foundry iron was sold in this territory last week. Southern iron prices continue soft, due to a large extent to the marketing of a considerable tonnage of warrant iron from a Tennessee furnace that recently went into the hands of a receiver. It is understood that warrants were scattered among several dealers, who have put out quotations at the minimum market figure for prompt shipment. These offers from different firms have led the trade to believe that the tonnage involved was much larger than actual figures would show. Anything like a buying movement would soon eliminate this particular iron as a market factor. With the exception of jobbing foundries making a specialty of machine-tool castings, the consumption of iron is considerably curtailed. The stove and range foundries are not melting anything like their usual quantity, nor have the nearby rolling mills consumed their ordinary tonnage of basic iron for some time. Inquiries are scarce, and the majority of sales are made under cover and mostly at the direct solicitation of salesmen. The trade expects the coming month to bring out some interesting developments. Purchasing for last half requirements has been deferred considerably later than usual by many large and small melters, who will probably not delay much longer. Based on freight rates of $2.90 from Birmingham and $1.26 from Ironton, we quote, f.o.b. Cincinnati, as follows:

Southern coke, No. 1 f'dry and 1 soft	$12.65 to $13.15
Southern coke, No. 2 f'dry and 2 soft	12.15 to 12.65
Southern coke, No. 3 foundry	11.65 to 12.15
Southern No. 4 foundry	11.15 to 11.65
Southern gray forge	10.65 to 11.15
Ohio silvery, 8 per cent. silicon	16.01 to 16.26
Southern Ohio coke, No. 1	15.01 to 15.51
Southern Ohio coke, No. 2	14.01 to 14.51
Southern Ohio coke, No. 3	13.76 to 14.01
Southern Ohio malleable Bessemer	14.26
Basic, Northern	14.26
Lake Superior charcoal	15.25 to 17.25
Standard Southern carwheel	26.90 to 27.40

(*By Mail*)

Coke.—A local agency reports the receipt of a tentative inquiry for a round lot of furnace coke for shipment the last half of the year. Furnace coke shipments on contracts previously made are moving at the usual rate. Foundry coke is slow, the only new business being from foundries making a specialty of machine-tool castings and their buying is confined to carload lots needed to fill in. The foundries are not now willing to make future contracts. Connellsville 48-hr. coke is quoted around $1.50 per net ton at oven for prompt shipment, and 72-hr. brands at $2 to $2.25. Contract figures run from 10c. to 25c. a ton higher. Wise County operators have lately stiffened prices, but only a few carload sales are reported as being made in this territory.

Finished Material.—Business booked the past week has been of an unsatisfactory nature, the lull being attributable to a large extent to the fear by many general contractors of labor troubles. Neither mills nor sales agencies have optimistic reports to make as to the sheet business. Nearby rolling mills are willing to fill prompt shipment orders on a basis of 3.40c. for No. 28 galvanized sheets and No. 28 black sheets are held around 1.85c. to 1.90c., both f.o.b. Pittsburgh. The local store quotations on No. 10 blue annealed sheets are 1.95c. to 2c. Little business is reported in either reinforcing concrete bars or hoops and bands.

Old Material.—The market is weak, and prices on nearly all grades are sagging. The absence of anything like a buying movement has, to some extent, brought about this condition. Large stocks are also considered a factor in influencing quotations. The minimum figures given below represent what buyers are willing to pay for delivery in their yards, southern Ohio and Cincinnati, and the maximum quotations are dealers' prices f.o.b. at yards:

Per Gross Ton

Bundled sheet scrap	$6.75 to $7.25
Old iron rails	11.00 to 12.00
Relaying rails, 50 lb. and up	19.75 to 20.25
Rerolling steel rails	9.75 to 10.25
Melting steel rails	9.00 to 9.50
Heavy melting steel scrap	9.00 to 9.50

Per Net Ton

No. 1 railroad wrought	$8.50 to $9.00
Cast borings	4.50 to 5.00
Steel turnings	4.50 to 5.00
Railroad cast scrap	9.50 to 10.00
No. 1 machinery cast scrap	10.25 to 10.75
Burnt scrap	6.50 to 7.00
Old iron axles	14.00 to 14.50
Locomotive tires (smooth inside)	9.00 to 9.50
Pipes and flues	6.00 to 6.50
Malleable and steel scrap	7.00 to 7.50
Railroad tank and sheet scrap	5.00 to 5.50

Birmingham

BIRMINGHAM, ALA., March 22, 1915.

Pig Iron.—Much annoyance has been caused by the sale of Tennessee iron which is in receiver's hands and is seeking a quick cash market on the basis of, say, $9.25, Birmingham. The fact that a local consumer recently secured a respectable tonnage on the same basis has been also disconcerting. However, neither the Tennessee iron, of which there was a total of only 25,000 tons, nor the local sale has established a basis of $9.25. The basis is still $9.50 for large and $9.75 for carload lots. Indications point to a renewal of the ability to move ordered billets and pig iron to Great Britain and Italy, some ship agencies having intimated a lowering of freight rates. Both these commodities have been ordered in respectable quantities. A recent inquiry for Birmingham iron came from Guatemala. The ocean rate from New Orleans that was quoted was $32 per ton, which is a sample of current ocean freights. Iron shipments are heavier than they have been. This is a feature that is encouraging. James Bowron, president of the Gulf States Steel Company, says: "The culminating point of the depression caused by the war has been passed and normal conditions are returning slowly but nevertheless certainly." He reports the billet and wire and fencing mills as operating at 100 per cent. capacity, with rush orders for delivery. The company has started the fourth open-hearth furnace. The bar mill is operating only at 25 per cent. The Fairfield wire mill of the American Steel & Wire Company is operating at greater capacity than since it started. The Tennessee Company's steel plant and rail mill will probably continue for some time at the same excellent rate that has now existed for over two months. Some steel shapes for war purposes are reported as being manufactured in this district. The wire movement outward is very heavy. The entire steel situation continues to grow better steadily. One pig-iron interest, with two active stacks, has sold something over its make this month, but another, also with two active furnaces, has sold only 1000 tons. The domestic inquiry is not brisk and the volume of March sales small. Basic iron is being consumed locally in larger quantities than for some time. Extremely little business has been done for the third quarter. What was

done brought no known advance in price. We quote, per gross ton, f.o.b. Birmingham furnaces, as follows:

No. 1 foundry and soft	$10.00 to $10.25
No. 2 foundry and soft	9.50 to 9.75
No. 3 foundry	9.00 to 9.25
No. 4 foundry	8.75 to 9.00
Gray forge	8.50 to 8.75
Basic	9.50 to 10.00
Charcoal	22.50 to 23.00

Cast-Iron Pipe.—The shipment of 720 tons from a Birmingham plant by rail to the Warrior River near Tuscaloosa, thence down the river to Mobile, thence by way of the Mississippi Sound to New Orleans and then up the Mississippi River to Plaquemine, La., 120 miles north of New Orleans, by a self-propelling barge of the Alabama & New Orleans Transportation Company, proved a thorough success and profitable to the barge line which made the shipping contract. The time consumed in going to Plaquemine and returning to the assembling basin in New Orleans was 4½ days. The barge line made an offer to carry 7200 tons of similar pipe from Birmingham to Corpus Christi, Texas, by transferring to rail at New Orleans, but the railroads met the barge line's rate reduction and got the business. The large water and gas pipe factories are still the busiest shops in the district outside of steel works, but contracts were not taken on a very remunerative basis. Delivery is also active and there is little or no accumulation. We quote, per net ton, f.o.b. pipe shop yards, as follows: 4-in., $20; 6-in. and upward $18, with $1 added for gas pipe.

Coal and Coke.—Coal is undoubtedly dull, and that is about all worth saying. Coke is irregular. The demand manages to take care of the output, but it is difficult to sell far ahead. Prices have been revised and we quote, per net ton, f.o.b. oven, as follows: Furnace coke, $2.60 to $2.90; foundry, $3 to $3.50, according to quality and nature of specific contract.

Old Material.—Steel-making scrap is in good demand and a considerable quantity has been taken, especially by Gadsden mills. There has been no betterment in other lines. We quote, per gross ton, f.o.b. dealers' yards, as follows:

Old iron axles	$13.00 to $13.50
Old steel axles	12.50 to 13.00
Old iron rails	12.00 to 12.50
No. 1 railroad wrought	8.50 to 9.00
No. 2 railroad wrought	7.50 to 8.00
No. 1 country wrought	8.00 to 8.50
No. 2 country wrought	7.00 to 7.50
No. 1 machinery cast	9.50 to 10.00
No. 1 steel scrap	8.00 to 8.50
Tram carwheels	8.50 to 9.00
Stove plate	8.00 to 8.50

St. Louis

ST. LOUIS, MO., March 22, 1915.

Pig Iron.—Inquiries have been for small lots only, but there has been noticeable a tendency to accelerate shipments on contracts. No sales in excess of 200 tons were reported. Prices are being held a little more firmly than at last report.

Coke.—There is one inquiry for 5000 tons expected to go to a by-product representative. Requests for increased shipment on contracts show that melt is increasing. By-product coke is quotable at $5.20 delivered St. Louis.

Finished Iron and Steel.—Sales are noted of 5 miles of standard section 70-lb. steel rails and about 350 tons of structural shapes for early delivery for an office building at Jefferson City awarded to the Christopher & Simpson Company, St. Louis. General business is reported as showing practically as many orders as a year ago at this time, but the aggregate of tonnage is lower. Agricultural implement houses are also buying a little better than for some time. Prompt shipment is the general demand, indicating low stocks. Prices are firm and well held by all interests as shown by bids opened for a few carloads of plates for the Mississippi River Commission. It is expected that the Missouri Kansas & Texas Railroad will close this week for about $2,000,000 of material, including 30 Mikado-type locomotives, 5 passenger engines, 15 steel passenger coaches and 1200 cars. Warehouse business is reported very good and prices are well held. For material out of warehouse we quote as follows: Soft steel bars, 1.70c.; iron bars, 1.65c.; structural material, 1.80c.; tank plates, 1.80c.; No. 10 blue annealed sheets, 2c.; No. 28 black sheets, cold rolled, 2.55c.; No. 28 galvanized sheets, black sheet gauge, 3.55c.

Old Material.—The market has been rather quiet, with prices well held by the dealers, despite the appearance of considerable old material since the first of the month. There is active inquiry for relaying rails and the prices quoted are very stiff. New lists out include 1200 tons from the Chicago & Eastern Illinois and 3000 tons from the Chicago, Burlington & Quincy. We quote dealer's prices, f.o.b. St. Louis, as follows:

Per Gross Ton

Old iron rails	$10.50 to $10.75
Old steel rails, re-rolling	10.25 to 10.50
Old steel rails, less than 3 feet	11.50 to 12.00
Relaying rails, standard section, subject to inspection	21.00 to 23.00
Old carwheels	10.25 to 10.50
No. 1 railroad heavy melting steel scrap	9.50 to 9.75
Shoveling steel	8.75 to 9.00
Frogs, switches and guards cut apart	9.75 to 10.00
Bundled sheet scrap	6.00 to 6.25

Per Net Ton

Iron angle bars	$10.75 to $11.00
Steel angle bars	9.00 to 9.25
Iron car axles	15.00 to 15.50
Steel car axles	10.75 to 11.00
Wrought arch bars and transoms	11.25 to 11.50
No. 1 railroad wrought	8.25 to 8.50
No. 2 railroad wrought	8.00 to 8.25
Railroad springs	8.75 to 9.00
Steel couplers and knuckles	9.00 to 9.25
Locomotive tires, 42 in. and over, smooth inside	9.00 to 9.25
No. 1 dealers' forge	7.50 to 7.75
Mixed borings	5.25 to 5.50
No. 1 busheling	7.75 to 8.00
No. 1 boilers, cut to sheets and rings	6.25 to 6.50
No. 1 railroad cast scrap	9.50 to 10.00
Stove plate and light cast scrap	8.00 to 8.25
Railroad malleable	7.25 to 7.50
Agricultural malleable	6.75 to 7.00
Pipes and flues	6.25 to 6.50
Railroad sheet and tank scrap	6.25 to 6.50
Railroad grate bars	7.50 to 7.75
Machine shop turnings	5.75 to 6.00

New York

NEW YORK, March 24, 1915.

Pig Iron.—The intimation in this column last week that more active buying of pig iron than has been seen this year was ahead has been more than borne out. Without thus far affecting other districts, a buying movement originated by Buffalo furnaces has radically stirred the foundry trade of the East. The campaign has been quietly carried on but with great vigor, particularly by two Buffalo interests. Estimates of the amount sold run as high as 150,000 tons, but this may include a number of large lots on which quotations are out and that are expected to be closed up by the end of this week. The usual quotation in these big transactions has been $12 at Buffalo furnace for No. 2 X, and considerable sales of malleable pig iron have been made at the same figure. While there are rumors that $12 has been shaded, no definite tonnages are cited at a lower price. Most of the buying—it may better be called selling, since it did not result from inquiry—was for delivery throughout the year. In some instances deliveries begin in April, and one contract involved deliveries from the latter part of March and through the year. Some of the Buffalo furnaces are now quite well sold into the fourth quarter. New England was the scene of much of the selling, the important machinery foundries there being credited with taking large lots. New England stove foundries also took part. In fact, there was a pretty general participation in the movement, many 500 and 1000-ton lots being included. In the New York district a pump company has bought considerable iron, and the Lackawanna Railroad has placed an order for 4000 tons. A New Jersey manufacturer of furnace castings has taken several thousand tons. Pipe interests have not participated heavily as yet, but these as well as radiator foundries are likely to buy. Eastern Pennsylvania producers have been compelled for the most part to act as spectators of this furious buying. Virginia furnaces likewise are unable to make sales on competitive terms in New England. Some Virginia iron has been sold at $12.50 at furnace for No. 2 X. We quote as

follows, at tidewater: No. 1 foundry, $14.25 to $14.50; No. 2 X, $14 to $14.25; No. 2 plain, $13.75 to $14; Southern iron, $14.50 for No. 1 and $14 to $14.25 for No. 2.

Ferroalloys.—Promises to ship ferromanganese soon continue to be made to New York representatives of British producers, but any realization of these assurances is lacking. When vessels will be loaded and how much of the alloy may be expected are as indefinite as ever. The feeling that political and diplomatic considerations are of much weight in releasing the alloy is growing weekly, now that the German blockade is on. Less anxiety among consumers is reported. The quotation for future delivery remains at $78, seaboard, with a fair amount of business closed for delivery when the metal is available. Foreign demand for 50 per cent. ferrosilicon is rather pronounced lately. Japan has purchased about 150 tons and Russia is inquiring for 150 tons. The quotation remains at $71 to $73, Pittsburgh.

Structural Material.—The week has been a repetition of that preceding, in that considerably more work was placed under contract than came into the market to take its place. The outlook is disappointing. There are not much more than 10,000 tons of building work pending, not including 3000 tons for two buildings previously mentioned but not yet before the steel trade. The McClintic-Marshall Company took 400 tons for the machine shop for the Robins Dry Dock & Repair Company and 200 tons for the Palmer Building, Providence, and the Eastern Steel Company 300 tons for the Strand Hotel addition, Atlantic City. The Southern Railway has closed for 500 tons at Charlottesville, Va.; a high school involving 500 tons at Huntington, W. Va., has been awarded, as has also a 250-ton building on Wards Island, New York. It is reported that the Pennsylvania Railroad has placed the 200 tons of bridge work of which bids were recently taken, while the New York Central is now in the market for 250 tons for various small bridges. We quote mill shipments at 1.10c. to 1.15c., Pittsburgh, or 1.269c. to 1.319c., New York, and from store, 1.85c. to 1.90c., New York.

Plates.—Business is dull. Local ship repair work is negligible. With the recent placing of 200 tank cars for the Prudential Oil Corporation with the American Car & Foundry Company, and the 478 cars for the Interborough Rapid Transit Company with the Pullman Company, there are hardly more than 1375 cars before the market, including the 1200 for the Missouri, Kansas & Texas, and 60 tank cars for the Grand Trunk. We quote steel plates at 1.10c. to 1.15c., Pittsburgh, or 1.269c. to 1.319c., New York, and from store, 1.85c. to 1.90c., New York.

Iron and Steel Bars.—Buyers are showing no concern over what will be the prices in the second quarter. Specifications on contract continue fair, stocks are generally low, but new buying is unimportant. More buyers are covered at 1.15c., Pittsburgh basis, for the second quarter than has generally been admitted and some of the largest buyers are apparently protected with 1.10c. contracts. The only active demand is for steel bars suitable for shrapnel shells. We quote mill shipments of steel bars at 1.15c., Pittsburgh, or 1.319c., New York, and refined iron bars 1.20c. to 1.25c., New York. Out of store in New York we quote iron and steel bars at 1.80c. to 1.85c.

Cast-Iron Pipe.—The Department of Water Supply, Gas and Electricity of the city of New York will award a contract involving 650 tons of 6 to 12 in. on Thursday of this week. Wellesley, Mass., will open bids on Friday for 800 tons of 6 to 14 in. The trade is expecting an announcement shortly by the city of Philadelphia asking bids on a large quantity of pipe running from 48 in. downward. The general demand continues at about the normal rate for the season. Prices show practically no change, with carload lots of 6-in. quoted at $20 to $20.50 per net ton, tidewater.

Old Material.—After a few days of considerable activity in heavy melting steel scrap, the demand subsided. It appears to have been merely a flurry. Nevertheless, dealers are of the opinion that another buying movement may be expected at no distant time and are accumulating stock for the purpose of holding themselves in readiness for it. The rolling mills are doing almost nothing, but prices of material used by them are holding up well. Foundries are taking cast scrap in moderate quantities, with some sales made by local dealers for delivery in eastern Pennsylvania. Relaying rails are in somewhat better demand as spring progresses. Railroad companies are inclined to be firmer in their views as to prices of this class of material. Dealers' quotations, per gross ton, New York, are as follows:

Old girder and T rails for melting	$8.75 to	$9.00
Heavy melting steel scrap	8.75 to	9.00
Relaying rails	19.00 to	19.50
Rerolling rails (nominal)	9.00 to	9.50
Iron car axles (nominal)	15.50 to	16.00
Steel car axles (nominal)	12.00 to	12.50
No. 1 railroad wrought	10.50 to	11.00
Wrought-iron track scrap	9.50 to	9.75
No. 1 yard wrought, long	9.50 to	9.75
No. 1 yard wrought, short	8.75 to	9.00
Light iron	3.50 to	4.00
Cast borings	6.00 to	6.25
Wrought turnings	6.25 to	6.50
Wrought pipe	8.00 to	8.25
Carwheels	9.50 to	9.75
No. 1 heavy cast, broken up	10.50 to	11.00
Stove plate	7.75 to	8.00
Locomotive grate bars	7.00 to	7.50
Malleable cast	7.25 to	7.75

Boston

BOSTON, MASS., March 23, 1915.

Old Material.—Prices continue firm, with a fair demand from the mills. The quotations given below are based on prices offered by the large dealers to the producers and to the small dealers and collectors, per gross ton, carload lots, f.o.b. Boston and other New England points which take Boston rates from eastern Pennsylvania points. Mill prices are approximately 50c. per ton higher.

Heavy melting steel	$8.25 to	$8.50
Low phosphorus steel	13.75 to	14.75
Old steel axles	12.75 to	13.25
Old iron axles	20.25 to	20.75
Mixed shafting	12.00 to	12.25
No. 1 steel wrought and soft steel	8.25 to	8.75
Skeleton (bundled)	5.50 to	5.75
Wrought-iron pipe	7.00 to	7.50
Cotton ties (bundled)	5.25 to	5.75
No. 2 light	3.25 to	3.75
Wrought turnings	5.00 to	5.50
Cast borings	5.00 to	5.25
Malleable	7.50 to	7.75
Stove plate	7.00 to	7.50
Grate bars	5.25 to	5.50
Machinery cast (price to consumers)	11.25 to	11.50

British Prices Again Advance

Furnaces Have Fuel Troubles—Dearer Freights on Imports—Australian Rail Order

(*By Cable*)

LONDON, ENGLAND, March 24, 1915.

Difficulties in obtaining fuel are exerting a dominating influence on pig iron, the market for which is feverish and nervous. It is hoped that the worst of the labor truculence is now over and that better working conditions are insured. Stocks are only moderate and shipments are slightly better. Furnaces in blast in the three principal districts number 165, against 171 at the corresponding time last year. Stocks of pig iron in Connal's stores are 129,859 gross tons, against 127,608 tons a week ago. Semi-finished steel is strong, and American prices are advancing because of dearer freights. Sellers are asking 130 to 135s. ($31.63 to $32.85), c.i.f., Wales. The Broken Hill Proprietary Works, Ltd., Australia, has booked 3300 tons of rails for Victoria. Quotations are as follows:

Tin plates, coke 14 x 20, 112 sheets, 108 lb., f.o.b. Wales, 16s. 9d. ($4.07), against 16s. ($3.89) last week.

Cleveland pig-iron warrants, 63s. ½d. ($15.34), against 16s. 2d. ($14.88) last week.

No. 3 Cleveland pig iron, makers' price, f.o.b. Middlesbrough, 63s. ($15.33), against 61s. 6d. ($14.96).

Steel black sheets, No. 28, export, f.o.b. Liverpool, £10 10s. ($51.09).

Steel ship plates, Scotch, delivered local yards, £9 10s. ($46.22), against £9 ($43.79) a week ago.

Steel rails, export, f.o.b. works port, £7 5s. ($35.28).

Hematite pig iron, f.o.b. Tees, 95s. ($23.12), against 92s. 6d. ($22.51) last week.

Sheet bars (Welsh), delivered at works in Swansea Valley, £7 ($34.06).

Steel joists, 15 in., export, f.o.b. Hull or Grimsby, £9 ($43.79), against £8 15s. ($42.58) last week.

Steel bars, export, f.o.b. Clyde £9 10s. ($46.22), against £8 15s. ($42.58) last week.

Ferromanganese, f.o.b., £15 10s. ($75.42).

Metal Market

NEW YORK, March 24, 1915.

The Week's Prices

Cents Per Pound for Early Delivery

	Copper, New York			Lead		Spelter	
Mar.	Lake	Electrolytic	Tin, New York	New York	St. Louis	New York	St. Louis
17	15.25	14.75	53.00	4.10	4.05	9.75	9.37½
18	15.50	14.87½	52.75	4.10	4.05	10.00	9.75
19	15.50	15.00	53.75	4.10	4.05	10.12½	9.87½
20	15.75	15.25	53.50	4.10	4.05	9.75	9.50
22	15.87½	15.25	53.50	4.10	4.05	9.75	9.60
23	16.00	15.37½	50.50	4.10	4.05	9.50	9.35

Copper has advanced, principally because of European buying. The scarcity of spot tin continues, but the metal is down 2c. per lb. Lead is firm at unchanged quotations. The course of spelter is uncertain under efforts to break the market. English brands of antimony continue nominal; Chinese is higher.

New York

Copper.—With Europe the principal source of demand, there was a good volume of buying late last week which sent quotations upward. Prime Lake was quoted yesterday at 16c. and sales of choice brands were reported as high as 16.50c., cash, New York. Electrolytic was quoted at 15.37½c., cash, New York. Both Lake and electrolytic shared the activity, but probably more of the latter was turned over. Resale copper, some of which had recently been offered at less than the producers' prices, has practically disappeared from the market. Exports this month have been good, amounting to 22,790 tons. The opinion of the trade is that with higher prices prevailing production will certainly be increased. Definite figures of course are lacking.

Tin.—The situation in spot metal is still tight, although it has been eased a little in the last week by the arrival of the steamer Chalister from Singapore with 250 tons. Up to yesterday the arrivals of the month amounted to only 510 tons. There is afloat 3195 tons but the time of arrival of a good part of this is uncertain; some is not due until late in March and still more is aboard vessels at Malta which are undergoing repairs. The situation has been complicated by the action of Great Britain in the latter part of last week in placing restrictions on the exportation of tin which practically amount to an embargo. It is understood that shippers must obtain a license from the government and consign their shipments to a British consul here. Importers in this country for whom the metal is intended must give guarantees that it will not be exported. The purpose of Great Britain is to prevent exportations to Scandinavia and thence to Germany. Domestic demand has been light. Late last week there was a rumor of heavy transactions in futures, but this report was not confirmed and it is much doubted. The quotation for spot tin yesterday was 50.50c. The London quotations have fluctuated widely in the past few days.

Lead.—The demand for lead has been almost entirely for export. The shipments for this month aggregate 2552 tons. More would have been sent abroad if it were not for the difficulty in obtaining cargo space. The London price yesterday was £23 2s. 6d. (5.02½c. per lb.) enough over the American price to make selling there profitable. The whole situation is one which has a bull influence abroad and a bear influence here, the latter being especially true because of the fact that the home trade is disappointing. The usual spring movement has not yet made its appearance. The New York quotation yesterday was 4.10c. and that at St. Louis, 4.05c.

Spelter.—Renewed efforts to force the market down by offerings of various positions on the New York Metal Exchange at much lower prices than prevail in the open market have unsettled prices and created much uncertainty in the minds of all concerned. After a recent and similar break the market started upward and 10c. again was exceeded, after which the market eased off. A broker acting for interests who believe that the market is unduly inflated yesterday offered and sold 50,000 lb. of spot metal at 8c., which was immediately re-offered at 8.50c. and again taken. May was offered at 7.62½c. and June at 7.25c., but no sales resulted. The broker who made the initial offering is said to have had 400 tons at different times which he was authorized to sell. Since the effort to force the market down was started he has sold 125 tons. In the open market offerings are few and business has been light. Exports up to yesterday totaled 4384 tons. The New York quotation yesterday was 9.50c. and that at St. Louis about 9.35c.

Antimony.—Chinese antimony is quoted at 22c., duty paid. Cookson's and Hallett's are nominal at 29c. and 27c., respectively. There is little or no inquiry.

Old Metals.—The market is more active and prices are higher. Dealers' selling prices are as follows:

	Cents per lb.
Copper, heavy and crucible	14.00 to 14.25
Copper, heavy and wire	13.75 to 14.00
Copper, light and bottoms	12.50 to 12.75
Brass, heavy	9.50 to 9.75
Brass, light	7.75 to 8.00
Heavy machine composition	11.50 to 11.75
Clean brass turnings	9.50 to 9.75
Composition turnings	9.75 to 10.25
Lead, heavy	3.75
Lead, tea	3.50
Zinc, scrap	6.50

Chicago

MARCH 22.—Marked activity in the buying of copper last week, added to a previously firm market, resulted in advanced quotations. In this tendency the entire metal market followed. Prices of pig-tin show considerable variation but are distinctly higher, while for lead the minimum price is now 4.05c. Spelter quotations for spot shipment are still difficult to quote accurately, and sheet zinc quotations are made only for immediate acceptance. We quote as follows: Casting copper, 14.75c. to 15c.; Lake copper, 15c. to 15.25c.; for prompt shipment; small lots, ⅛c. to ¼c. higher; pig tin, carloads, 55c.; small lots, 57c.; lead, desilverized, 4.05c., and corroding, 4.30c., for 50-ton lots; in carloads, 2½c. per 100 lb. higher; spelter, nominally 9.75c.; sheet zinc, 13.50c., price for immediate acceptance; Cookson's antimony, 28c, for cask lots; other grades, 22c. On old metals we quote buying prices for less than carload lots as follows: Copper wire, crucible shapes, 12c.; copper bottoms, 10.50c.; copper clips, 11.75c.; red brass, 10.50c.; yellow brass, 8.50c.; lead pipe, 3.40c.; zinc, 7.25c.; pewter, No. 1, 25c.; tinfoil, 35c.; block tin pipe, 39c.

St. Louis

MARCH 22.—The spelter market has quieted during the week and the metal is fairly well held today at 10c. Lead is firmer than last week at 4.30c. Tin is higher at 55c.; Cookson's antimony is held at 25c.; Lake copper, 15.50c.; electrolytic copper, 15.35c. In the Joplin ore market zinc blende was weaker and 60 per cent. was quotable at $55 to $65 per ton, with the top settlement $68. The market generally showed a decline of $5 to $8 per ton from recent high figures. Calamine sold at $30 to $36 for 40 per cent. with the best settlement $40. Lead ore was higher with 80 per cent. $50. Miscellaneous scrap metals are quoted as follows: Light brass, 6c.; heavy yellow brass, 8.50c.; heavy red brass and light copper, 10c.; heavy copper and copper wire, 11c.; zinc, 5c.; lead, 3.50c.; tea lead, 3.50c.; pewter, 23c.; tinfoil, 28c.

The W. M. Pattison Supply Company, Cleveland, Ohio, has opened a machinery sales office in Detroit, Mich., at 1534 Dime Savings Bank Building. It is under the management of E. B. Barker, who formerly represented the Carpenter Steel Company in the Detroit territory.

Iron and Industrial Stocks

NEW YORK, March 24, 1915.

The past few days have been especially noteworthy for the great activity and sharp advances in prices of certain industrial stocks. Bethlehem Steel common was the leader in this respect, its advances occurring by jumps from day to day. Other stocks which were prominent in the upward movement were those of automobile manufacturing companies. United States Steel common finally joined the procession and made a sharp gain yesterday. The range of prices on active iron and industrial stocks from Wednesday of last week to Tuesday of this week was as follows:

Allis-Chal., com..	9½ - 9¼	Int. Harv. Corp., pref.	92 - 95⅞
Allis-Chal., pref.	34½ - 37	Lackawanna Stl.	28½ - 30½
Am. Can, com...	27¼ - 30	Nat. En. & St., com.	12½ - 13½
Am. Can, pref...	93¾ - 94⅞	Pressed Stl., com.	28 - 29½
Am. Car & Fdy., com.	40¼ - 45¼	Pressed Stl., pref.	86½ - 88
Am. Car & Fdy., pref.	110¾ - 114	Republic, com...	19½ - 20⅞
Am. Loco., com..	21 - 24	Republic, pref...	76½ - 77⅛
Am. Loco., pref.	75 - 77	Rumely Co., pref.	4⅛ - 4¼
Am. Steel Fdries.	24¾ - 26¼	Sloss, com.....	26 - 26¾
Bald. Loco., com.	32 - 33	U. S. Steel, com.	43¾ - 48¼
Bald. Loco., pref.	95 - 96⅛	U. S. Steel, pref.	104½ - 105½
Beth. Steel, com.	57⅜ - 73	West'g'hse Elec..	68 - 72½
Beth. Steel, pref.	104¾ - 105½	Chic. Pneu. Tool.	48 - 49
Case (J. I.), pref.....	80	Cambria Steel...	41⅜ - 43
Colorado Fuel...	23 - 27⅜	Lake Sup. Corp..	6 - 7⅝
General Electric.	139⅜ - 141	Pa. Steel, pref...	50 - 52½
Gt. No. Ore Cert.	31¾ - 34⅛	Warwick	9½
Int. Harv. of N. J., com.	92½ - 96½	Cruc. Steel, com.	13¼ - 13¾
Int. Harv. Corp., com.	67½	Cruc. Steel, pref.	75 - 77
		Harb.-Wk., Ref., pref..	99

Dividends

The Yale & Towne Mfg. Company, regular quarterly, 1¾ per cent., payable April 1.

The Safety Car Heating & Lighting Company, regular quarterly, 2 per cent., payable April 1.

The Remington Typewriter Company directors have deferred action on dividends, pending the arrival of figures relative to foreign business.

The E. W. Bliss Company, regular quarterly, 1¼ per cent. and an extra of 1¼ per cent. on the common stock and regular quarterly, 2 per cent. on the preferred stock, payable April 1.

The Chicago Pneumatic Tool Company, regular quarterly, 1 per cent., payable April 26.

Safety in Ohio Foundries

A meeting of foundrymen and foundry employees was held at the Hotel Statler in Cleveland, March 19, at the call of Victor Noonan, director of safety, representing the Industrial Commission of Ohio. Twenty-five foundries were represented. Thomas D. West was made chairman of a committee which will work in the interest of safety measures in connection with foundry operations in Ohio. Four sub-committees will be appointed, representing respectively, iron, steel, malleable, and brass and aluminum foundries. On each sub-committee will be two foundry proprietors and two employees. On the general committee Mr. West is associated with John O'Neil, Columbus; Fred L. Baumgartner, Cleveland, and Thomas Rowan, Hamilton. It will formulate provisions for safety and sanitation in foundries in line with the regulations prepared for the State of New York, which will be presented to the Assembly for enactment into law.

Milwaukee Metal Trades Meeting

A contribution to charity, unique because of its origin and the sentiments inspiring it, was made at the annual meeting of the Milwaukee Metal Trades and Founders' Association, Milwaukee, Wis., March 17. Substituting a plain "dollar dinner" for the elaborate banquets of past years, the association voted to contribute the difference in the cost to the poor of the city, and accordingly Mayor G. A. Bading, who was a guest of honor, was presented with a check for $600 to use as he sees fit to relieve the distressed. The banquet following the meeting was held at the Deutscher Club where covers were laid for 109 members and several guests. Plain fare was served instead of costly viands. A. F. Sheldon lectured on "Service and Its Relation to Reward." The annual election resulted as follows: President, William W. Coleman, president Bucyrus Company, South Milwaukee; vice-president, Charles H. John, president Wisconsin Motor Mfg. Company, Milwaukee; secretary, William J. Fairbairn, manager Milwaukee Metal Trades and Founders' Bureau; treasurer, First Trust Company, Milwaukee. Directors—Theodore O. Vilter, president Vilter Mfg. Company; J. W. Petersen, vice-president Richardson-Phenix Company, and Henry Harnischfeger, president Pawling & Harnischfeger Company.

Third Vote on Sheet and Tin Mill Wages

PITTSBURGH, PA., March 24, 1915.—(*By Telegraph.*) —On Saturday, March 27, a third referendum vote will be taken by lodges in the sheet and tin-plate mills that sign the Amalgamated Association scale for the purpose of deciding whether the men will submit to the reduction recently proposed. This fresh vote is being taken on request of the lodges composed of men employed by the American Rolling Mill Company, Middletown, Ohio; Newport Rolling Mill Company, Newport, Ky., and Canton Sheet Mill Company, Canton, Ohio. These lodges voted twice against accepting the reduction but their request for a third vote indicates that their members have changed their attitude in the matter. It is believed that this third vote will be favorable to the acceptance of the proposed reductions.

Robesonia Iron Company to Build New Furnace

The blast furnace of the Robesonia Iron Company, at Robesonia, Pa., is to be torn down and a new and larger unit is to be constructed under the direction of Frank C. Roberts, of Philadelphia. Bids for the tearing down of the old furnace are being taken this week, but it has not yet been determined when it will be put out of blast. The present stack was built in 1855 and since has been enlarged and rebuilt. It was last rebuilt in 1885. All of the materials for the new stack are on the ground. The new furnace will be of the semi-thin-lined type, 80 ft. high, with an 18-ft. bosh and 11-ft. hearth. Aside from the building of the new stack only minor repairs and improvements will be made.

Decreasing Imports of Manganese Ore

Imports of manganese ore into this country for January, 1915, were only 9849 gross tons, against 24,135 tons in January, 1914, a decrease of 14,286 tons or nearly 60 per cent. For the seven months ending with January, 1915, the total imports were 158,560 tons; in the corresponding periods ending with January, 1914 and 1913, they were 178,258 and 251,572 respectively. The figures show a progressive decrease, representing nearly 100,000 in two years.

Germany's January Pig-Iron Output

The production of pig iron in Germany in January was 874,135 metric tons, compared with 1,566,505 tons in January, 1914. This is the largest monthly output since the outbreak of the war, exceeding that of December by about 20,000 tons. The output in September, the lowest during the war, was 580,087 tons.

The Department of Commerce reports an excess in the value of exports of merchandise over imports in February of $173,604,366, which is more than double the next largest February export balance, recorded in 1908. The imports of the month totaled $125,123,391, while the exports reached the enormous total of $298,727,757. The department states that the same great preponderance of exports has continued thus far in March.

The Pennsylvania Railroad placed in service March 18 the first section of the electrified suburban lines between Philadelphia and Paoli, 20 miles.

JANUARY FOREIGN IRON TRADE

Tonnage Exports Increase Nearly 20 Per Cent. —Slight Gain in Tonnage Imports

The report of the Bureau of Foreign and Domestic Commerce for the month of January, 1915, shows that the gain in the value of exports of iron and steel and manufactures thereof did not decline slightly, as in the two previous months. It showed that the value of these exports increased $3,113,808, or 20.8 per cent. over the total for December, 1914. The values were $15,689,401 for November, $14,939,613 for December, 1914, and $18,053,421 for January, 1915. Similar imports showed a slight gain of 7 per cent. in value, being $1,616,593, as compared with $1,510,678 in December, $2,157,450 in November and $2,334,895 in January, 1914.

The value of these exports for the seven months ended with January was $104,835,738, as compared with $155,107,708 for the corresponding period in 1914; while figures for imports were $14,251,630 and $18,145,439. These totals, which are approximately for the duration of the present war, indicate that the war demand for iron and steel goods for export, great as it is, had not, up to February, been able to offset the world-wide paralysis of business. The figures show it to be only two-thirds of the same business done for that period in 1913. Similar imports show a loss of $3,893,809, or about 21 per cent.

The tonnage of exports for which quantities are given shows a gain of nearly 20 per cent. over December, but is just short of the total for November. The totals are November, 140,752 gross tons; December, 116,816 tons and January, 139,789 tons. It is significant that these exports in January, 1915, were 14.3 per cent. greater than in January, 1914, while December and November, 1914, showed losses in tonnage of 35.7 per cent. and 20.2 per cent. respectively over corresponding months in 1913. Substantial gains were made in the shipments of all items except pig iron, scrap, structural shapes and finished goods, radiators, pipes and fittings, etc. The total value of iron and steel exports for which tonnages are given was $5,512,439 in January, 1915, as against $4,863,976 in January, 1914, an average value per gross ton of $39.44 and $40.95 for the respective months.

Details of the exports of these tonnage commodities in January and the seven months ended with January, compared with the same periods of the previous calendar year, are as follows:

Exports of Iron and Steel

	January		Seven months	
	1915, Gross tons	1914, Gross tons	1915, Gross tons	1914, Gross tons
Pig iron	8,862	12,852	52,275	143,837
Scrap	1,327	6,160	10,610	51,591
Bar iron	391	371	3,409	8,464
Wire rods	8,235	869	31,611	18,882
Steel bars	17,933	9,511	81,359	99,042
Billets, ingots and blooms, n.e.s.	16,046	2,864	39,598	22,846
Bolts and nuts	985	1,631	7,268	12,721
Hoops and bands	1,020	1,015	6,046	7,593
Horse shoes	416	107	5,702	706
Cut nails	217	189	1,163	2,233
Railroad spikes	214	270	3,171	5,024
Wire nails	5,838	2,831	26,176	22,943
All other nails, including tacks	197	204	1,987	1,996
Pipes and pipe fittings	....	16,684	....	152,932
Cast pipes and pipe fittings	3,907	....	42,345	.....
Wrought pipes and pipe fittings	6,905	....	63,622	.....
Radiators and cast-iron house heating boilers	128	554	1,862	4,186
Steel rails	8,864	17,625	73,859	246,553
Galvanized iron sheets and plates	3,343	2,443	22,138	34,515
All other iron sheets and plates	667	381	3,694	7,329
Steel plates	9,078	7,567	56,433	103,669
Steel sheets	8,338	6,560	56,112	80,755
Structural iron and steel	10,833	15,610	89,300	207,964
Tin and terne plates	7,014	2,351	40,015	23,089
Barb wire	9,530	5,893	68,529	49,848
All other wire	9,501	4,230	56,350	48,374
Totals	139,789	118,772	844,635	1,357,092

Imports for which quantities are given amounted to 10,569 gross tons in January, as compared with 9046 tons in December, 24,165 tons in November, 22,754 tons in October and 17,737 tons in January, 1914. With the exception of steel billets without alloys, and scrap, every item was less in January, 1915, than for the same month the year previous, while in December scrap alone showed an increase. The average value per gross ton of the iron and steel and manufactures thereof imported in January, 1915, was $51.62, as compared with $51.53 in January, 1914.

Details of the imports of tonnage commodities in January and the seven months ended with January, as compared with the corresponding periods of the previous calendar year, are as follows:

Imports of Iron and Steel

	January		Seven months	
	1915, Gross tons	1914, Gross tons	1915, Gross tons	1914, Gross tons
Pig iron (including ferrosilicon)	....	....	....	*38,892
Ferrosilicon	509	399	3,805	†1,299
All other pig iron	2,481	3,602	76,374	†38,540
Scrap	2,383	1,285	21,406	19,769
Bar iron	551	2,112	8,148	15,259
Structural iron and steel	316	709	4,936	6,216
Hoops or band iron	....	....	648	.....
Ingots, blooms and steel billets	....	....	....	*6,317
Steel billets without alloys	61	1	869	†2,174
All other steel billets	1,955	3,399	18,959	†10,136
Steel rails	305	1,224	14,842	8,697
Sheets and plates	58	155	2,005	1,312
Tin and terne plates	1,608	3,689	4,290	12,781
Wire rods	342	1,162	2,382	7,924
Totals	10,569	17,737	158,664	169,316

*Figures cover period July 1, 1913, to Oct. 3, 1913, inclusive.
†Figures cover period beginning Oct. 4, 1913.

Imports of iron ore in January amounted to 75 286 gross tons, as compared with 51,053 tons in December, 90,222 tons in November and 101,804 tons in January, 1914. For the seven months ended with January 717,609 gross tons was imported against 1,560,421 tons for the corresponding period of a year previous.

Increase in Exports of Machine Tools and Automobile Trucks

That the European war, despite the increasing hazards in ocean transportation, has continued a stimulus to exports from this country is shown in a striking manner by the latest statistics of the Bureau of Foreign and Domestic Commerce. Metal-working machinery is still conspicuous in these returns. From the low ebb of last August when such exports to all countries were $298,259, there has been a steady increase until January shipments of metal-working machinery, including machine tools, reached $2,903,740, nearly $500,000 in excess of those for December. Over January, 1914, the increase is approximately $2,000,000.

Shipments of automobiles continue strong. Commercial automobiles to the number of 3972 valued at $10,989,442 were exported in the seven months ended January 31, 1915, against 436 valued at $714,261 in the seven months ended January 31, 1914. In January 935 were shipped valued at $2,545,527. Exports of passenger automobiles fell off from 13,553 valued at $12,540,593 in the seven months ended January 31, 1914, to 6904, valued at $5,808,099 in the seven months of the present fiscal year.

Since the beginning of hostilities there has been a decided increase in the exportation of explosives. The shipments for January amounted to $2,610,066 and for December $2,170,387 as compared with $484,656 and $885,658 respectively a year ago. The total for the seven months ended with January, 1915, $9,258,297, nearly equals the shipments for the entire year of 1914.

Firearms continue an important export. In 1914 the value of firearms sent to Europe was $5,146,867, against $3,920,008 for 1913. The total for January, $2,156,757, was equal to almost 40 per cent. of the entire shipments for 1914.

RAIL INJURIES FROM GAGGING

Developments Observed by Dr. Dudley—Distribution of Wheel Contacts

The discussion of the report of the rail committee at the meeting of the American Railway Engineering Association, March 16 to 18, held at the Congress Hotel, Chicago, brought out an interesting statement from Dr. P. H. Dudley, rail expert of the New York Central Lines, regarding information not heretofore available. He said:

"We find in a very few rails that leave the hotbeds the transformations are not entirely complete, from hot molten metal to the finished product, during the recrudescence of the head and the base. That condition sometimes results in leaving a central core in the head that is less ductile than it is in another place and which is injured, more or less, in the gagging. If there are any transformations that are not complete enough, the tendency of the gag is to uncap the rail slightly, leaving an impression, and subsequently the wheels will cause a crack in the metal from which an interior transverse fissure will develop. That rail will be a high rail and will be gagged upon the head. The low rails will have the base turned up. The metal in the base must be shortened, and that in the head lengthened, the reverse of the treatment for the high rail. If there are any incomplete transformations in the head of that rail, we may check the central core. In those I found, and I could trace all of those with the straight edge that had been gagged more or less, I termed that the inter-granular nuclei. We had only a few specimens and I termed those non-ductile metal. It was difficult to find any metal that was separated, except in the track. But in the past few days we have had a great many specimens come in, in which we were able to show that the fissure was produced by the gagging as well.

INTER-GRANULAR NUCLEI

"One of the interesting developments of the inter-granular nuclei came in, a few days ago, in a Bessemer rail that was rolled in 1906. That was when they were making the rails as fast as they could in the Bessemer output, and we were using a 2-in. nozzle for steaming the ingots. In this case we have the inter-granular nuclei shown plainly in the head of the rail. An ideal etching of that same section shows there was an inclusion of cast iron and we have an outside envelope, a very ductile metal, a higher carbon, shown by the shading, but a central core that was checked in the gagging. This was a low rail, and gagged from the base. We have all the different tests showing that the base was very much harder; it was tougher, and we have all the exterior envelope to show that that was a non-ductile metal. There is a probability that considerable improvemen can be made, even under the present methods of gagging. In gagging some of these high rails in the center, they are often hit four or five times in very short spaces. You straighten the long sweep in the rail by making a series of short curves and you gag it in 10, 12 or 15 places on top, and cut that long sweep into a series of short curves, and shorten it at each place it is gagged. If we had maximum by which we could take out that long sweep without stretching over an inch, probably the rail would not be injured so much.

WHEEL IMPACT OBSERVATIONS

"We have been making a number of observations by chalking rails and noticing the width of the passing wheel mark. We chalk right across the rail. Some of the wheels only removed about a quarter of an inch of the width of the mark, and another would take off a half inch at a different place. This is all under the passenger equipment. Now, the proposition is to carry the chamfering out pretty nearly to the rim of the wheel, so that, as the train wheels run over the rails, we will produce a wear very uniformly over the head, as we did a decade ago. I have had trouble with these transverse fissures, and I wanted to see whether we had conclusive proof of the effect of the gagging of these rails, and they have all given proof that the coning of the wheels and the shape of the tread is not what it should be. It is desirable to return to a less coning, but to have the tread of the wheel extend out so that it will cover the full width of the head of the rail, for the tangents at least, and so that it will be wider on all of the curves where the rail may happen to be laid a quarter of an inch or a half inch wide on the curves. We think the wheel pressure tenses are entirely too great, not only on the wheel but on the rail heads, for the best wear of the rail. Our rails from New York to Chicago cost, for the two-passenger tracks, about $10,000,000. In going over portions of the line the other day we saw that we were only wearing off inside the web. There were hardly any marks outside of that, so we expect to extend out the chamfer so as to distribute the wheel contacts, make the contacts larger, and distribute our wheel intensities over a larger area."

Dr. Dudley stated further that canting of the rail had been tried in the hope of overcoming the above difficulties, but without success, and that his road had determined to extend the wheel coning out over the rail head. Asked as to the formation of fissures in the base of the rail as the result of gagging, he replied that none had been found, but rather that breaking effects were induced by locked-up strains set up in the gagging operation.

The meeting brought out the usual attendance of approximately 500 and the discussions were participated in with an interest equal to any previous standards.

The officers chosen for the coming year are: President, Robert Trimble, Pennsylvania Lines West, Pittsburgh; first vice-president, A. S. Baldwin, Illinois Central, Chicago; second vice-president, John G. Sullivan, Canadian Pacific, Winnipeg; treasurer, George H. Bremmer, Interstate Commerce Commission, Chicago; secretary, E. H. Fritch, Karpen Building, Chicago.

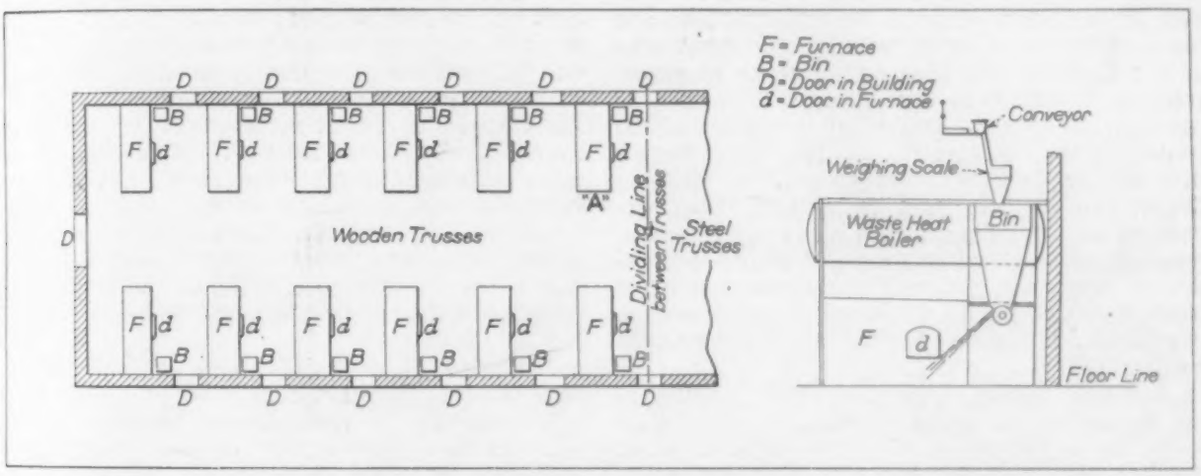
Sheet Metal Trades Club

The Sheet Metal Club of the United States held its annual meeting at the Hotel Gibson, Cincinnati, Ohio, March 16. The club was originally organized by the manufacturers of sheets and the fabricators of sheet metal specialties, with a view to improving the quality of sheet metal products. The low prices that have prevailed for such a long time have led some of the manufacturers to market cheaper lines of sheets and it is the aim of the club to maintain standards in such products. J. Charles Wicks, president and general manager of the Garry Iron & Steel Company, Niles, Ohio, was elected president for the ensuing year and T. James Fernley, secretary and treasurer of the National Hardware Association, Philadelphia, was selected secretary and treasurer of the club. In the evening the club members and their friends were guests of E. N. Hoffeld, sales manager of the Ferdinand Dieckman Company, Cincinnati, at a beeksteak dinner in Newport, Ky.

Powdered Coal Fire at Troy, N. Y.

On Thursday night, March 18, a fire occurred in one of the furnace buildings of the Burden Iron Company at South Troy, N. Y., in which powdered coal was used as the fuel. As the fire was calculated to bring out some lesson concerning the use of pulverized coal, an investigation was made. This survey does not indicate that the coal-burning system is chargeable for the fire, but that rather a number of circumstances, including wooden roof trusses laden with coal dust, which provided highly combustible material, helped to spread the flames. It does bring out, however, some hints on the relative location of different parts of a pulverized coal equipment and the accompanying sketch has accordingly been prepared.

Some 22 of the 80 puddling furnaces were being operated on pulverized coal, with Quigley apparatus. It appears that the operator of furnace A had withdrawn a slide from the valve at the bottom of the pulverized coal bin, or hopper, thinking this would cause the coal dust to flow more freely into the controller. The result was that at the moment a heat was being taken a puff of wind blew in through the open door and deflected a stream of coal dust leaking through the slide opening, somewhat like that shown in the cross-section sketch. There was instantly a flash, flames shot up to the roof and as these were wooden trusses covered with more or less fine coal dust, as stated, there was a rapid conflagration which spread throughout the wooden section of the building. The fire started at 10 p.m. and was under control at 2 a.m. Friday morning.



Sketches to Explain the Cause of Fire at One of the Puddling Furnaces of the Burden Iron Company; a Workman Removed a Slide from Bottom of Pulverized Coal Bin and the Wind from the Door Blew the Stream of Coal on the Iron Being Removed from the Furnace

It would appear that the bins might well be placed on the opposite side of the furnace from the furnace openings shown, and leakage streams would be affected by neither the door in the building nor the opening in the furnace. It is interesting to add that it is the intention to rebuild at once and to continue the use of powdered coal. The furnace building is about 500 ft. long, 60 ft. wide and 30 ft. high to the roof trusses.

The Taylor-Wharton Iron & Steel Company, High Bridge, N. J., at the annual meeting of stockholders elected the following directors and officers: Directors: Henry J. Cochran, New York City; Robert Hobson, Hamilton, Ont.; Dr. Henry M. Howe, Bedford Hills, N. Y.; James Imbrie,, New York City; R. Burnham Moffat, New York City; Frank C. Roberts, Philadelphia; William Selfridge, Philadelphia; V. G. Simkhovitch, New York City; Knox Taylor, High Bridge, N. J.; John F. Wallace, New York City. Officers: Knox Taylor, president; Victor Angerer and Dr. Henry M. Howe, vice-presidents; W. A. Ingram, secretary and treasurer; L. N. Aller, assistant secretary and assistant treasurer.

The Adams Brothers Company, Findlay, Ohio, has changed its name to the Adams Truck Foundry & Machine Company.

British Steel Exports Fall Off 45 Per Cent.

The iron and steel exports of Great Britain for February of this year show a decrease, as was to be expected, both in tonnage and in values from those of February, 1914. The total last month, excluding iron ore and scrap, was 193,942 gross tons, against 345,303 tons for February, 1914, a decrease of 151,361 tons. The decrease for the first two months was 382,527 gross tons, being 801,097 tons to March 1, 1914, and 418,570 tons to March 1, 1915. The falling off in values for the past two months was £3,801,761, or from £8,709,136 to £4,907,375. In pig iron the decrease in exports was 32,687 tons, the total for February, 1915, being 19,726 tons, against 52,413 tons in the same month in 1914. In steel bars an increase of 17,863 tons is reported for February, the total exports being 33,397 tons, against 15,534 tons for February, 1914. This is the only instance of an increase in exports for any one item. Of these bar shipments France took 24,977 tons. The exports of galvanized sheets were 21,732 tons, or 46,363 tons less than for February, 1914.

Exports of ferromanganese last month were about 2200 gross tons, compared with about 7400 tons in February, 1914, none of this coming to this country. Imports of manganese ore last month were 25,634 tons, against 29,635 tons in February, 1914, a decrease of 4001 tons. For the first two months of 1915 the decrease in imports of manganese ore was 25,541 tons or from 90,318 tons, March 1, 1914, to 64,777 tons, March 1, 1915.

Imports of iron and steel, excluding iron ore and scrap, in February were 48,853 gross tons, against 179,274 tons for February, 1914, a falling off of 130,421 tons. The values to March 1, 1915 and 1914, were £2,384,363 and £999,454 respectively, a decrease of £1,384,909. Imports of iron ore for February, 1915, were 380,497 gross tons, compared with 511,875 tons in February, 1914. The decrease in ore to March 1, 1915, was 293,891 tons, or from 1,040,200 tons to 746,309 tons. Imports of crude zinc were 11,608 tons for February, 1915, against 10,433 tons for February, 1914.

More Enlargement of Sheet-Making Capacity

The Canton Sheet Steel Company, Canton, Ohio, at a meeting of the stockholders held recently, decided to about double the capacity of its plant. Six new hot sheet mills will be added, bringing the total number to 12, and considerable other machinery will be required. In addition, it is planned to extend the galvanizing and roofing departments, black sheet warehouse, and opening, pickling, annealing, cold-rolling and finishing departments. It was also voted to increase the company's capital stock from $500,000 to $2,000,000. It is expected that about $500,000 of the amount authorized will be required for the improvements. It is planned to place contracts shortly so that the additional mills will be ready for operation by the end of the year.

Trade Commission Not to Harass Business

President Urges Helpful Work— An Investigation in the Interest of Combinations in the Export Trade

WASHINGTON, D. C., March 23, 1915.—The developments of the first week of the life of the Federal Trade Commission are of deep significance to the business men of the country and include the following: The communication to the commission by President Wilson of his opinion that the chief aim of the commission with respect to the business of the country should be constructive rather than destructive and that all forms of harassment should be avoided; the announced determination of the commission to refuse to make rulings upon either concrete or supposititious cases for the purpose of guaranteeing corporations against prosecution under the anti-trust laws; a declaration of willingness at all times to confer with business men with regard to the general scope of the anti-trust laws and the development of the commission's policies thereunder; the launching of an investigation of export trade combinations in foreign countries; and the appointment by the Chamber of Commerce of the United States of a special committee to co-operate with the Trade Commission on matters affecting the welfare of American industries. The programme thus far developed is eminently conservative and generally satisfactory and will tend to reassure those who, realizing the almost boundless scope of the authority conferred by law upon the commission, have awaited with more or less anxiety a declaration of its policy.

President Wilson's view of the chief function of the commission, as communicated by him to Chairman Davies, should be distinctly encouraging to business men. During the past six months the President has learned a great many facts about the business of the country—and especially about "big business"—and all this information has tended to modify his preconceived opinions and to render him far more conservative than he was when he entered the White House. He now realizes that the very life of the country depends upon the unrestricted transaction of all legitimate business and that anything in the nature of an attack upon time-tried business methods can only result in disaster. Believing that the Trade Commission can be made a valuable agency for the promotion of business, the President has urged Chairman Davies and his colleagues to develop the helpful side of their work and to subordinate inquisitorial proceedings, at least until the necessity for their employment in individual cases has been fully demonstrated.

NO RULINGS ON SUPPOSED CASES

The announcement by the commission that it will not rule on concrete or supposititious cases, with a view to guaranteeing immunity to corporations that may desire to employ certain methods, has followed the transfer to the commission by the Department of Justice of a vast amount of correspondence embracing a thousand inquiries from business men in all parts of the country as to what may and what may not legally be done under the anti-trust statutes and especially under the provisions of the Clayton law and the law creating the Trade Commission, with its extraordinary prohibition of practices constituting "unfair competition." In acknowledging these inquiries the Attorney-General has stated that the Department of Justice could not see its way clear to making categorical replies to the questions propounded, but would refer the communications to the Trade Commission when organized. After an examination of a large number of these inquiries the commission has decided that it is wholly impracticable to rule thereon. In the first place, it is obvious to the commission that to answer the questions submitted would start an avalanche of similar inquiries which would overwhelm the commissioners and the entire force of assistants available under existing appropriations. In the second place, the commission does not regard it to be a function conferred upon it under the law to provide a system of licenses to proceed with business plans that may be submitted to it for approval. The construction of the anti-trust laws and especially those enacted by the last Congress is peculiarly a function of the courts. Any advisory construction which the commission might make would be subject to review by the courts; hence no corporation, acting upon the commission's advice, could legally claim immunity from prosecution or set up a ruling of the commission as a defense. The function of advising a corporation as to what it may or may not do is that of an attorney specializing in the law of corporations and the commissioners do not intend to invade this field.

Although the commission will not make formal rulings upon questions submitted to it, the individual commissioners and the general counsel of the organization will be prepared at all times to receive and confer with business men who may desire information as to the general scope of the anti-trust laws. These conferences of necessity will deal with generalities and will be entirely informal. In order that it may execute the laws, the commission must reach a determination as to many general questions of construction and of policy, and views based upon these determinations will be freely communicated to those who seek advice. In all cases, however, it will be made perfectly clear that the commission assumes no responsibility in the way of granting immunity to corporations which may shape their methods in accordance with what they believe to be the commission's policies.

TO INVESTIGATE FOREIGN TRADE COMBINATIONS

The formal decision of the commission to begin the investigation of foreign trade combinations will be good news to the entire American export trade. Section 6 of the act creating the commission empowered it "to investigate from time to time trade conditions with foreign countries where associations, combinations, or practices of manufacturers, merchants, or traders, or other conditions, may affect the foreign trade of the United States and to report to Congress thereon, with such recommendations as it deems advisable." President Wilson is taking a very lively interest in this phase of the commission's work and will undoubtedly make a recommendation to Congress at its next session in accordance with the findings based upon the inquiry about to be undertaken. The President has already gone far enough to say that if he can be shown that combinations among American manufacturers and

exporters can be made in such a way that all those business men who desire to go into them can do so, he will favor them, but until that fact can be demonstrated he is "from Misssouri." The President's idea is that no combination for export trade would be legitimate which would enable a few powerful corporations to organize to exploit the trade of certain countries and which would exclude from participation on equal terms other corporations in the same industry. Though claiming no profound knowledge of business methods, the President is in doubt as to whether big corporations would care to make combinations for the export trade unless permitted such a monopoly of combination as would exclude from the benefits of the arrangement some of their rivals in the domestic trade. In discussing the matter more concretely he has been quoted as saying that he would not endorse a law under which one of the big so-called trusts could enter into a combination with its most powerful rivals, fixing prices, limiting quantities of goods to be exported and dividing foreign markets by arbitrary allotment and at the same time excluding from participation all other American producers in the same industry. The fixing of prices, the limiting of exports and the division of foreign territory seem to be regarded by the President as entirely legitimate features of export combinations, provided that the advantages resulting therefrom may be open to all who may reasonably ask to participate.

The Chamber of Commerce of the United States, pursuant to a resolution adopted at its last annual meeting in this city, has appointed a special committee to co-operate with the Federal Trade Commission on all matters affecting the welfare of American industries. The committee will consist of Harry A. Wheeler, of Chicago, a former president of the chamber; Guy E. Tripp, of the Westinghouse Electric & Manufacturing Company, and W. L. Saunders, president of the Ingersoll-Rand Company. The general scope of the work of this advisory committee has not yet been determined, but it has been arranged that after the Trade Commission is fully organized and has begun the consideration of the details of its general policy, a series of conferences with the chamber's committee will be held, after which an announcement will be made as to the committee's functions. W. L. C.

New Members American Iron and Steel Institute

The American Iron and Steel Institute announces the election March 19 of the following as active members:

Abram C. Denman, Jr., general manager, Southern California Iron & Steel Company, Los Angeles, Cal.

Sydney Dillon, chief engineer, Carnegie Steel Company, Braddock, Pa.

Leonard B. Miller, Oglebay, Norton & Co., Wade Building, Cleveland, Ohio.

Walter Scott Ottinger, district sales manager, Cambria Steel Company, Philadelphia, Pa.

Howard S. Stebbins, M. A. Hanna & Co., Cleveland, Ohio.

Arthur Howland Young, supervisor of labor and safety, Illinois Steel Company, South Chicago, Ill.

On the same date the following were elected associate members.

Robert L. Baldwin, electric furnace representative, United States Steel Corporation, 71 Broadway, New York City.

John O. Henshaw, 79 Milk street, Boston, Mass.

At the same meeting of the board of directors Friday and Saturday, May 28 and 29, was fixed as the time for the next meeting of the Institute. Sessions will be held at the Waldorf-Astoria, New York City. It is understood that there will be fewer formal papers and a greater amount of informal discussion of topics of interest to members at this meeting.

STEEL WORKS BENZOL PLANTS

A New Source of Profit—Carbolic Acid in Part the Objective

Recent announcements that various steel companies would provide benzol recovery systems in connection with their by-product coke oven plants emphasizes the value of this product whose manufacture these companies have so long neglected. In Germany very few coke oven plants are without the benzol recovery feature. In France and England also the recovery of benzol is extensive.

The expansion of this adjunct to the steel industry in this country is shown in recent statements in *The Iron Age* as to the projection of benzol recovery plants by the South Sharon and Gary plants of the United States Steel Corporation; by the Lackawanna Steel Company at Buffalo, N. Y.; by the Republic Iron & Steel Company at Youngstown, Ohio; by the Inland Steel Company at Indiana Harbor, Ind., and by the Cambria Steel Company at Johnstown, Pa. The Dominion Iron & Steel Company at Sidney, Cape Breton, is also erecting such a system.

The two plants of the Steel Corporation will use the Carl Still system and will have a capacity of 800,000 gal. and 4,500,000 gal. of benzol per year respectively. The Lackawanna and the Republic companies have adopted the Otto recovery system, and the Inland Steel Company the Koppers system, and the Cambria and another company not yet named, the Edison system, these last having a capacity of 24,000 and 36,000 gal. per year respectively. The plant of the Inland Steel Company will serve 86 coke ovens, will produce 2800 gal. of benzol daily, and be in operation July 1.

Benzol, when recovered by the plants referred to, will largely be adapted for use as a motor spirit in place of gasoline. Such use in Europe is extensive and has been for a number of years. A recent estimate, referring to the large consumption of gasoline in this country and its cost, states that 29,600,000 gallons of benzol is available annually from the 14,800,000 tons of coal consumed in the 6200 by-product coke ovens of the country, and that it can be sold as a substitute for gasoline at a profit of 24c. for every ton of coke produced. Based on 2000 net tons of dry coal per day and two gallons of benzol and homologues recovered from the gas from one net ton, the engineer of a prominent builder of benzol recovery plants says that the average yield would be 978,000 gal. of 67 per cent. benzol, 234,000 gal. of 16 per cent. toluol, 117,000 gal. of 8 per cent. xylol and 131,000 gal. of 9 per cent. solvent naphtha, or 1,460,000 gal. in all, which at 15c. per gal. would have a value of $219,000. Adding to this the value of naphthalene and other recovered products, the total would be $222,810. Deducting operating and other expenses from this he estimates that the profit yield is 46 per cent. on the capital invested and that the cost to produce one gallon is 5.8c.

Besides benzol, which is a substitute for gasoline and is a base for many analine dyes as well as a solvent for making varnish, toluol, an important compound recovered at the same time, is also a base for many important dyes and the starting point in the manufacture of many explosives. Xylol is an important solvent in the rubber industry, while the heavy naphtha is used as an illuminant and for the enrichment of certain gases. Benzol is also the base for the manufacture of crude carbolic acid. This is the particular phase of the matter to which Thomas A. Edison has recently devoted his attention. Carbolic acid imports were cut off by the war and the acid is necessary in producing records for talking machines. Mr. Edison now manufactures it himself. A recent competitive bid of his was 56c. per lb. on an inquiry for 270,000 lb. of carbolic acid, as against $1 per lb. from a competitor.

It is evident that the financial return to steel companies installing benzol recovery systems will be of no small proportions.

The American Locomotive Company has received an order from the Missouri, Kansas & Texas for 10 Pacific and 30 Mikado locomotives.

PERSONAL

E. S. Jackman, of E. S. Jackman & Co., agents for the Firth-Sterling Steel Company, claims, as a "man who has been selling steel to railroads since his twentieth birthday," that he "has a moral right to crown his fiftieth birthday with a tribute to American railroads and the men who run them." He has put this

E. S. JACKMAN

tribute in the form of a printed folder with an original message, as the following from it indicates:

A railroad is not the unfeeling and relentless devourer of automobiles and little children at grade crossings described by impassioned advocates in crowded court rooms. The whistle of danger is an engineer's use of a piece of machinery, but it is also the echo of a man's thought for his own babies left at home.

A railroad has been likened to an octopus by those who do not know the flesh and blood and personality of railroads. The soul of a railroad is fidelity, and if a railroad is an octopus, it is an octopus with a soul.

A railroad is a disciplined power: owning rails and cars and locomotives; engaging the highest quality of mechanical skill and expert knowledge; but the glory of a railroad is the united adjustment of its living nerves to patience, courtesy, speed and safety.

Samuel Wales, of the ordnance department of the Homestead steel works of the Carnegie Steel Company, has sailed for Cardiff, Wales, on matters connected with ordnance contracts for the British Government.

Richard B. Franken has retired from the partnership conducted by Edwin H. Jonson and himself under the name of Engineering Sales Company, 114 Liberty street, New York. He has sold his interest to Mr. Jonson, who has assumed all liabalities and will continue to conduct the business under the old name.

J. S. Irvin, formerly manager of the Laughlin works of the American Sheet & Tin Plate Company at Martins Ferry, Ohio, has resigned to become general manager of the McKeesport Tin Plate Company, McKeesport, Pa.

Milton C. Stuart, formerly assistant steam engineer of the Cambria Steel Company, Johnstown, Pa., has resigned to become mechanical engineer in the United States naval engineering station at Annapolis, Md., effective April 1.

Sir Dawson Trevor, chairman of the board of Vickers, Ltd., Sheffield, England, arrived in New York last week.

B. Joachim, who after the breaking out of the war went to South America as special agent of the Bureau of Foreign and Domestic Commerce at Washington, has now established an office at 32 Broadway, New York, for organizing and centralizing foreign trade agencies.

Dr. W. C. Huntington has just been appointed by Secretary Redfield as chief of the Chicago branch of the Bureau of Foreign and Domestic Commerce, which was established 15 months ago. He is a graduate of Columbia University, 1907, in mechanical engineering. For two years he was assistant to Frank N. Speller, metallurgical engineer of the National Tube Company, and for two years was in the metallurgical department at the Gary works of the Indiana Steel Company. Then three years were spent in Germany and Belgium, making studies in iron and steel fields for the degree of doctor of engineering at the Royal Technical College in Aix la Chapelle. He also reported to various American companies on machinery and iron and steel questions, particularly on practice in the countries named. More recently he has been on the technical staff of the National Tube Company in preliminary field work.

W. C. Chapman, for several years connected with the sales force of the Philadelphia office of Manning, Maxwell & Moore, Inc., has been appointed manager of that branch.

Wesley D. Stanger, formerly with the Royal Typewriter Company, has been appointed sales manager of the Stromberg Electric Company, Chicago, to take effect at once.

R. Stanley Smith, designer and chief engineer with the A. O. Smith Company, Milwaukee, Wis., manufacturer of automobile parts and motor trucks, will open an office as consulting engineer, April 1, in Detroit, Mich.

W. R. Warner, Warner & Swasey Company, Cleveland, Ohio, was the speaker before the Good Fellowship Club of the Cleveland Crane & Engineering Company, Wickliffe, Ohio, at its monthly meeting, March 18, giving a very interesting illustrated lecture, his subject being "An Evening with the Planets and Stars."

A. E. Holcomb, Chicago, has been appointed chief engineer and designer for the Rood Mfg. Company, excavating and dredging machinery, Grand Rapids, Wis. He was for many years in charge of the Chicago plant of the Clyde Iron Works, Duluth, Minn.

W. L. Wright, formerly vice-president of the Taylor-Wharton Iron & Steel Company, has been elected a director and a vice-president of the Keystone Watch Case Company, Philadelphia.

Warren S. Fisher, formerly with the Crown Cork & Seal Company, Baltimore, Md., has become general manager of the Coronet Cork & Seal Company, 60 Broadway, New York, recently incorporated.

George Hills has been appointed head of the arc welding department of the Burke Electric Company, Erie, Pa.

A. A. Hassan is examining manganese ore deposits in Tennessee, West Virginia and Virginia, and can be temporarily addressed at the Tennessee Copper Company, Copperhill, Tenn.

Charles Cantley, formerly assistant manager of the Nova Scotia Steel & Coal Company, and son of Thomas Cantley, the general manager, has been made quartermaster-general with the Canadian expeditionary forces in France.

Dr. H. T. Kalmus has returned to Boston, Mass., from the School of Mines, Queens University, Kingston, Ont., where for five years he has been conducting experiments in metallurgy.

Zach Webb has opened an analytical laboratory at 861 Lilac street, Pittsburgh, for the analysis of ores, limestone, coal, coke, silica rock and other products.

C. J. Prentiss, one of the best-known hardware buyers in the country, has resigned from the Simmons Hardware Company, St. Louis, to take charge of the buying department of the Van Camp Hardware & Iron Company, Indianapolis, Ind. He has become a stock-

holder in the company and will be assistant secretary. C. S. Winders, sales manager, has been made assistant treasurer, retaining his former position, however. Mr. Prentiss has been in the hardware business 35 years. Before going to St. Louis he was with the Belknap Hardware & Mfg. Company, Louisville, Ky.

J. F. Goble, formerly secretary and general manager of the Rockwell Furnace Company, New York, is now president of the Audit Company, of New Jersey, with offices in Jersey City, N. J.

W. P. Snyder, president Shenango Furnace Company, Pittsburgh, has returned from an extended stay at Palm Beach, Fla.

E. R. Crawford, president McKeesport Tin Plate Company, McKeesport, Pa., has gone to Cuba on a vacation, to remain until about May 1.

W. H. Donner, president Cambria Steel Company, and chairman of the Pennsylvania Steel Company, has returned to Philadelphia from a vacation spent in Cuba.

James A. Campbell, president Youngstown Sheet & Tube Company, Youngstown, Ohio, is spending a short vacation in Hot Springs, Ark.

Pittsburgh and Nearby Districts

The Youngstown Iron & Steel Company, Youngstown, Ohio, has let a contract for most of the electrical equipment for its new steel plant to the General Electric Company, Schenectady, N. Y. It includes one 2000-hp. induction motor to drive the bar and slab mills, a 500-kw. motor-generator set, three 1500-kva. primary transformers and three 200-kva. secondary transformers, with switchboard to serve all the electrical equipment, part of which remains to be placed. There will be no blooming mill in this steel plant, but instead a bar mill and a slab mill. By moving a switch, either the bar mill or the slab mill can be operated, but both mills cannot be run at the same time. Ingots of 12 x 12 in. size will be delivered to the sheet-bar mill and rolled into sheet bars, while slabs up to 10 x 26 in. will be delivered to the slab mill, to be broken down and later finished in the present plate mill. This week inquiries went out for the cranes, namely, an 80-ton ladle crane, two 25-ton traveling cranes and a special ingot charging and drawing crane, all to be electric. Last year the Youngstown Iron & Steel Company bought part of the crane equipment of the old open-hearth plant of Milliken Brothers, Inc., located on Staten Island, New York City.

The Youngstown Car & Mfg. Company, Youngstown, Ohio, is about completing an order for 30 standard gauge steel cars and 30 steel skips for the Acme Cement Corporation, New York City.

The Central Steel Company, Massillon, Ohio, has placed contracts for the erection of an office building, 40 x 100 ft., and laboratory 40 x 60 ft. The new buildings will contain dining rooms, shower baths, etc., for the use of officials.

The Riter-Conley Mfg. Company, Pittsburgh, has received a contract for an addition to the assembling shop of the Hockensmith Wheel & Mine Car Company, Penn Station, Pa., and also for the steel work for a new machine shop to be 90 x 90 ft. About 150 tons of structural steel will be used in these two jobs.

Holders of common shares in the Trussed Concrete Steel Company of Youngstown, Ohio, and Detroit, Mich., are subscribing for additional stock to the extent of 6 per cent. of their holdings. The company has $1,750,000 common stock. With the money to be realized from the stock sale, the company is building an addition to its chemical products plant.

The H. Koppers Company, First National Bank Building, Pittsburgh, has closed a contract with the Cambria Steel Company, Johnstown, Pa., for the erection of 42 Koppers by-product coke ovens. It is understood that they will replace other coke ovens which are to be torn out.

Directors of the Youngstown Sheet & Tube Company, Youngstown, Ohio, have decided to offer pro rata to holders of both preferred and common stock the entire issue of $5,000,000 of preferred stock, for which authorization has been requested from the stockholders at a meeting to be held April 6. This stock is to be offered at par value, subject to the approval of the plan by stockholders. More than enough consents already have been received to make the plan effective.

The Pittsburgh Valve & Fittings Company, Barberton, Ohio, which had tentative plans for additions to its plant, has dropped these for the present.

The Warren Axe & Tool Company, Warren, Pa., is building an addition 100 x 100 ft., in which it will install a large press to punch eye holes in axe heads, thus doing away with rolling. Other new equipment will be installed later, all of which has been bought. The present capacity of the plant is 100 dozen axe heads per day, and this will be doubled.

The Modern Tool Company, Erie, Pa., recently purchased an Ingersoll slab milling machine with side heads and a 42-in. x 18-ft. Cincinnati planer. The company states it does not contemplate any additions to its plant at present.

The Erie Stove & Mfg. Company, Erie, Pa., is having plans prepared for the construction of a factory, 250 x 300 ft., one story.

The Petroleum Iron Works Company, Sharon, Pa., is enjoying a heavy demand for tank cars. The company has recently entered orders for more than 200 steel tank cars for oil carrying purposes, and at present is giving employment to 400 men, and is operating its plant day and night.

Reports that the tin-plate plant of the N. & G. Taylor Company at Cumberland, Md., had started up recently after being closed down for some months are partly incorrect. One department, which has been shut down for several weeks, recently started up in full, but all other departments of the plant have been running practically full since January 1. Reports that there had been a general reduction in wages are also incorrect, as this was confined to a minor wage readjustment in only one department. The company is receiving some good-sized orders for export and also notes an increase in its domestic business since the beginning of the year. Its output of tin plate is well sold up for some months.

The Monarch Machine Works, Altoona, Pa., contemplates building a plant for the manufacture of motor trucks to be fitted with a newly designed type of engine.

The Municipal Shale Brick & Block Company, Martinsburg, W. Va., will erect a plant costing $100,000 for the manufacture of bricks, fireproofing, etc. J. W. Candler is superintendent and in charge of machinery purchases.

The Reed Mfg. Company, Erie, Pa., will at once build an addition to its plant. Plans are being prepared.

The Carnegie Steel Company now has 38 blast furnaces in operation and 21 idle. Ohio No. 1 stack at Youngstown, Mingo No. 2, and Clairton No. 3 have been recently started, while No. 1 Clairton stack has been blown out for relining.

The offices of Trimble, Mudge & Co., Inc., dealers in iron and steel scrap, have been removed from the Frick Building to rooms 1332-1334 Oliver Building, Pittsburgh.

The offices of E. W. Mudge & Co., factors in iron and steel, and manufacturers and shippers of coke, have been removed from the sixth floor to rooms 512 to 514 Frick Building, Pittsburgh.

The H. Koppers Company announces that on and after March 18 all its mail and telegrams should be addressed to the Firsst National Bank Building, Pittsburgh, Pa., which will be the location of its general offices. A branch office will be maintained in Chicago, at the present address, in charge of James C. McMath, vice-president.

It is announced by Consul John M. Savage, Sheffield, England, that as a result of numerous inquiries regarding Firth's stainless steel, Thomas Firth & Sons, Ltd., Sheffield, England, have arranged with their American branch, the Firth-Sterling Steel Company, McKeesport, Pa., for its manufacture in this country. This steel was described in *The Iron Age*, February 4, 1915.

Machinery Markets and News of the Works

There is a growing tendency on the part of machine tool builders to protect domestic users of their tools. In other words, it is realized that the great demand created by the war for certain types of machines should not militate against home manufacturers whose needs have built up and sustained the machinery industry. The trend of thought in this direction is undoubtedly due to the steadily growing inquiry and purchasing throughout the country. In New England, buying of metal working machinery for other than war needs is considerable. The home trade in New York is more active. The increase in new factories and plant extension in the Chicago district is satisfactory. The domestic demand in Cleveland has broadened, while the war business holds up. Makers of automobiles and their accessories are contributing in a pleasing way to activity in Detroit. In that city the foundry trade is getting busier. Tool builders in Milwaukee are still busy on war orders. In Cincinnati the metal trades in the first quarter of 1915 showed a gain of 18 per cent. in activity over the last quarter of 1914. More confidence is discernible in the Central South, and many classes of special equipment are moving well. More tendency to start new enterprises is seen in the vicinity of Birmingham. The machine tool trade in St. Louis is slow, both in new and second-hand machinery. From the Pacific Northwest the report is that Puget Sound did the greatest business in its history in February. From both San Francisco and Puget Sound ports large shipments are being made to Australia, the Orient and Asiatic Russia.

New York

NEW YORK, March 24, 1915.

Domestic inquiries are appearing with greater frequency. Many of them have no connection with the war, although it is admittedly difficult to tell, sometimes, whether or not an inquiry springs from some demand from abroad for supplies which are needed by the armies in the field. Business which is entirely disassociated with the war is coming from the manufacturers of pleasure automobiles and parts. The demand for machine tools for export to Europe and Canada, and from factories which are taking up the manufacture of shrapnel and lyddite shells continues to be heavy. In practically every warehouse and factory where machine tools are the products handled or made, machines are to be found boxed for export. They are entirely inclosed and not merely crated as may be done with domestic shipments.

The demand for second-hand tools, particularly lathes, is excellent and dealers are making some quick turnovers. Tools bought one day are sold the next. A representative of an English firm who has been here for some weeks has been hoping to return home week after week, but repeated cabled instructions to find more equipment have kept him here.

Harry W. Weller, St. Henry, Montreal, Canada, manager for Babcock & Wilcox, Ltd., has been in this city inquiring for machines to be used in making shrapnel and lyddite shells.

W. R. Grace & Co., who have been large buyers of machine tools in recent months, have a new inquiry out for equipment to be shipped to England, it is understood, for a shipyard in that country.

To the list of American firms who are engaged in the making of shrapnel or shells there have been several additions, but they are all taking every means possible to avoid publicity and some of the makers of machine tools are equally as reticent concerning the use of their machines in such work.

Lewis F. Shoemaker & Co., Philadelphia, who have a contract for supplying material for the third-tracking of the elevated railroad in Brooklyn, N. Y., are adding to their shop space and equipment. They have purchased several wall radial drills and a large multiple punch.

The Morrow Mfg. Company, Elmira, has placed orders against the large list of machine tools it issued some weeks ago. The orders did not aggregate as much as was expected, but totaled a good figure.

The Lourenco Marques Harbor & Railway Board, Portuguese Africa, has forwarded to American manufacturers an inquiry for eight dry dock cranes, seven 5-ton and one 12-ton, all to be electrically operated. Bids are to be in April 30.

The Delaware, Lackawanna & Western Railroad is inquiring for a forging hammer, large shear and three machine tools for delivery to Buffalo.

The Savage Arms Company, Utica, N. Y., plans to double the size of its plant and will use the increased capacity for the manufacture of the Lewis air-cooled machine gun. W. J. Green is vice-president.

The Acme Die-Casting Corporation, Bush Terminal Building No. 5, Thirty-fifth street and Third avenue, Brooklyn, N. Y., has leased about 12,000 sq. ft. of floor space and is going into the die-casting business. It is equipped with the latest machinery. E. N. Dollin is president.

The Vacuum Oil Company, 61 Broadway, New York, will break ground for an addition to its plant at Olean, N. Y., to cost about $40,000. It is erecting its own plant and equipment.

The Morrow Mfg. Company, Elmira, N. Y., is preparing to build a heat-treating building, 75 x 245 ft. It is not in the market for any equipment at this time.

The Coronet Cork & Seal Company, 60 Broadway, New York, has been incorporated to manufacture a patented bottle seal, bottling appliances, machinery, etc. It plans to establish a factory; but the exact location has not been settled upon. W. S. Fisher is general manager.

The John H. LaMoy Company, Glens Falls, N. Y., has been organized to manufacture a patented mouthpiece burner for linotype machines and oxy-acetylene cutting and welding machines. It is negotiating for the purchase of the plant of the Glens Falls Forging & Welding Company, manufacturer of ornamental and structural ironwork, forgings, etc. It is interested in power hammers, bulldozers, bending machines, punches, shears, structural steel and iron, and brass tubing. John H. LaMoy, 3 Union street, Glens Falls, is president; John A. Curley, vice-president; and Beecher W. Sprague, secretary and treasurer.

The Davison-Namack Foundry Company, Ballston Spa., N. Y., has been incorporated with a capital stock of $50,000 by R. H. Davidson, W. Namack and S. I. Foster, Amsterdam, N. Y. It will manufacture a stationary gasoline engine and carry on a general machine-shop and foundry business. Ralph H. Davison is president.

The August Schubert Wagon Company, Oneida, N. Y., has purchased the entire vehicle business of the Schubert Brothers Gear Company, Oneida.

The Liberty Lace & Netting Works, Bronxwood avenue and 229th street, New York, has had plans prepared by Lockwood, Greene & Co., 101 Park avenue, New York, for a one-story and concrete boiler house and engine room to cost about $5000.

The Allegretti Mfg. Company, Geneva, N. Y., manufacturer of razor strops, has postponed the construction of its factory addition, recently reported as planned.

The Bronx Company, 177th street and Bronx River, New York, cotton goods finisher, has had plans drawn for an addition to its boiler plant, and has awarded contract for two vertical boilers to the Samuel Smith & Son Company, Paterson, N. J. These boilers will be the beginning of a new equipment. W. H. Bottin is treasurer.

The Polson Mfg. Company, manufacturer of auto-tops and wind shields, Buffalo, will build an addition to its factory at 27 Chenango street.

Wills & Gardner, Middletown, N. Y., manufacturers of cut glassware, have completed plans for a factory to be erected this spring.

The Transcontinental Wheel Company, Hornell, N. Y., has been incorporated with a capital stock of $125,000 to manufacture rotary appliances, wheels, appliances for lessening friction, motors for automobiles, etc. The incorporators are H. and E. J. Orsenigo and F. V. Ubezzi, 675 First avenue, New York City.

The Kaustine Company, Perry, N. Y., manufacturer of sanitary appliances, is taking bids and will let contracts for a factory 60 x 200 ft., one story. The general offices of the company are in the Ellicott Square Building, Buffalo.

The Sheet Lathing Corporation, New York City, has been incorporated with a capitalization of $100,000 to manufac-

ture building tools and materials. W. Geraerdts, 509 West 174th street, New York City; H. N. Morse, 1327 Dean street, Brooklyn, and F. L. Kane, Huntington, Long Island, N. Y., are the incorporators.

The Municipal Gas Company, Albany, has let contract to the Peter Keller Building Company, for the erection of a power house, 108 x 146 ft., to cost $60,000.

The Fedders Mfg. Company, manufacturer of automobile and motor boat radiators, Buffalo, has let contract for an addition, 112 x 165 ft., to cost $27,000, to be made to its plant at Tonawanda street and West avenue.

Bids are being taken this week by the Board of Contract and Supply, Troy, N. Y., of which John J. McLaughlin, 21 City Hall, is secretary, for a 24-in. by 6-ft. planer for the machine shop at the central school.

The E. A. Cook Wagon Works, Buffalo, has been incorporated by Edwin G. Henry, R. and Edwin G. Cook to manufacture wagons and other vehicles. It has located a factory at 77 East North street.

The Terrace City Motor Car Company, 14 South Broadway, Yonkers, N. Y., is having plans prepared for the construction of a storage building and machine shop, to be erected at 350 South Broadway.

Port Chester, N. Y., is advertising for bids for a pump house, etc., for a sewage disposal plant to be constructed at an estimated cost of $100,000. F. S. Odell, Port Chester, is the engineer. Roy L. Burns is city clerk.

The Adjustable Wheel Company, Peekskill, N. Y., has been incorporated and will establish a factory. J. W. Husted, J. H. Murray and R. C. Weaver, Tarrytown, N. Y., are the incorporators.

The W. A. Case & Son Mfg. Company, Buffalo, of which Whitney G. Case is president, has let contracts for alterations and additions to its plant at Kensington avenue and the New York Central Railroad Belt Line, to be used for the manufacture of plumbers' supplies, radiators, etc.

The C. Klinck Packing Company, Buffalo, will build an addition to the refrigerating building at its plant on Depot street and the Erie Railroad, at an estimated cost of $10,000.

Hurd Brothers, Buffalo, will add a planing mill, 96 x 100 ft., to their plant at Bailey avenue and the Lackawanna Railroad.

The Mayer Carbureter Company, 2673 Main street, Buffalo, will build a factory at Main and Amherst streets.

The Wrought Metal Products Company, Buffalo, has been incorporated by M. F. Dumble, H. R. H. Richards and J. H. German to manufacture electrical supplies, glass and metal. The capital stock is $15,000.

New England

BOSTON, MASS., March 23, 1915.

Opinion varies as to the prospect of domestic demand for machine tools. The belief is unanimous that the return of active business, apart from that connected with war, will be slow. The difference in expressed judgments is as to how slow will be the improvement. From various sources comes the statement that there are bright spots and those not so bright. Chief among the latter are the railroads, which in their buying of machine tools have responded very little to such benefits as have been accorded them in increased rates. They can get along with old machinery better than with crippled rolling stock and worn rails.

Among the manufacturers of metal goods outside of machine tools and machinery generally, a good deal of activity exists which is not traceable to the war. These people buy machinery of one sort and another. In fact, the volume of general sales of equipment outside of the war game is quite considerable at this time.

Much of the equipment now being purchased by manufacturers of war supplies is quite special in its character, and contracts prohibit the possibility of cancellation should the war come to a sudden end. Stocks of standard machinery for similar purposes are being absorbed so rapidly that the builders have no worry regarding orders, but are approaching future business somewhat cautiously. For one thing, they wish to protect such of their regular customers as may come into the market from time to time.

Some sections of New England are suffering from an epidemic of a severe form of grippe, and working forces are depleted in some cases by the absence of men unable to attend to their labors. The epidemic is considered one of the most serious in some years.

The Brown & Sharpe Mfg. Company, Providence, R. I., has awarded the contract for greatly increasing its building known as No. 5. This structure is 49 x 146 ft., two stories. Four additional stories will be built to bring it to the standard hight of the works. The additional space will be devoted to the extension of facilities for the manufacture of its standard products. It will be equipped along the line of the other machine shop buildings.

The Musgrave Machine Company, East Boston, Mass., of which William H. Musgrave is proprietor, will establish works for the manufacture of boilers and other sheet-metal work, forgings and machine repairs, especially in connection with ship repairs.

The Central Tool Company, 56 Dudley street, Providence, R. I., proposes to build a factory in Auburn, R. I., 40 x 100 ft., one story. The company manufactures dental tools and a new micrometer caliper.

The Rhode Island Supply & Engineering Works, Providence, R. I., plans to build an addition, 62 x 105 ft. three stories.

The Victor Shoe Machinery Company and the Boston Machine Works, Lynn, Mass., are to unite their interests.

Philadelphia

PHILADELPHIA, PA., March 22, 1915.

W. W. Anstine & Co., 1218-20 Filbert street, Philadelphia, have been awarded the contract for the erection of a one-story concrete power house, 71 x 117 ft., to be erected by the Department of Health and Charities, Philadelphia, at an estimated cost of $56,535.

Pending a reorganization of the Motor Kart Company, Scranton, Pa., the erection of the proposed automobile factory, estimated to cost about $50,000, has been postponed. The contract had been awarded to the Parsons Construction Company, Scranton, Pa.

The Treen Box Company, Memphis and Tioga streets, Philadelphia, has awarded the contract for the construction of a brick factory, two stories, 21 x 50 ft., to cost about $4000. Additional equipment has been purchased.

The Kimble-Durand Glass Company, Vineland, N. J., manufacturer of thermos bottles, etc., has started the construction of a factory, 80 x 150 ft., of structural steel, to be used for the manufacture of vials, etc.

The Carbon Limestone Company, Hillsville, Pa., has plans under way for an addition to its plant for pulverizing limestone, to cost $40,000.

The Staunton Dairy Products Corporation, Staunton, Va., is in the market for refrigerating equipment, motor-driven machinery, etc.

Chicago

CHICAGO, ILL., March 22, 1915.

Satisfaction is to be had in noting the increased number of projects for the building and enlarging of factories. This improvement is attributable in part to the usual spring activity in new construction, but is also due to a branching out into new lines of manufacture by many organizations. Money for business expansion is not much easier to secure when it has to be borrowed, but sound enterprises are finding available funds for the extension of their businesses in new directions. It is not too much to say that favorable foreign trade balances are having their effect in improving financial conditions. These and other evidences point to a substantial increase in domestic machinery business. One local machinery house expects that March will show a record business in domestic sales. The Stewart Mfg. Company has placed orders for a number of Potter & Johnson automatics and Gridley screw machines, together with auxiliary toolroom equipment. For railroad needs few inquiries have appeared; but some companies are known to be preparing specifications prior to the issuance of machinery lists. The construction of a number of commercial garages is also a product of the season, to a degree at least, but it suggests a market of increasing importance, particularly for second-hand tools.

The Martin-Senour Paint Company, Chicago, has had plans prepared for a four-story addition to its plant, to cost $12,000. The first floor will be a machine room, the second floor a chemical laboratory and the third and fourth floors, general factory space.

E. J. Bloom, 1300 East Forty-seventh street, Chicago, is building a one-story garage, 106 x 221 ft., to cost $16,000.

The Knight Light Company, Chicago avenue and Orleans street, Chicago, is having plans prepared for a seven-story factory, 110 x 130 ft., to cost $150,000.

J. E. O'Brien is erecting a one and two-story brick factory, 60 x 122 ft., at 4046 South Wentworth avenue, at a cost of $12,000.

John F. Jelke, Polk street, Chicago, is about to erect a

six-story addition, 64 x 109 ft., the estimated cost of which will be $75,000.

The Boettcher Pattern Company, Chicago, has been formed to manufacture metal patterns by W. F. J. Boettcher and Arthur Boettcher, 4844 Berteau avenue. The company is organized with a capital of $2500.

Clasen & Son, Chicago, have incorporated with a capital stock of $1000 to manufacture sheet metals. The incorporators are Emil L. Clasen, 3114 Shields avenue, Albert N. Clasen and John Sunland.

The Dahl Iron Works Company, Chicago, has been formed by Harold P. Dahl, 2837 West Armitage avenue, Thomas G. Gage and F. A. Fischer. It has a capital stock of $2500 and will manufacture structural and ornamental steel.

The Eureka Plowing Company, Chicago, has been organized with a capital stock of $25,000 by Claire Mendel, 108 South LaSalle street; Charles B. Obermeyer and Herbert S. Simpson. It will manufacture and deal in farm implements.

The Uni-Motion Door Handle Company, Chicago, has been incorporated with a capital stock of $2400 to manufacture builders' hardware. The incorporators are George F. Lovedall, W. M. Harrison, 1739 West Fifty-first street, and John A. Stratker.

The Bergie National Spark Plug Company, Rockford, Ill., has been organized with a capital stock of $5000 by Andrew N. Adolph and Arthur J. Bergstrom to manufacture spark plugs and other motor vehicle parts.

Fire at Quincy, Ill., destroyed the plants of the Hayton Pump Company, the Stationers' Mfg. Company and the Dayton-Dick Company, manufacturer of magnetos; the Gem City Stove Mfg. Company, and the local power plant, with a loss estimated at $300,000.

The S. B. Patch & Sons Company, Streator, Ill., is having a concrete foundation laid for a steel and brick extension to its foundry.

The Allaire-Woodward Chemical Company, Peoria, Ill., has announced plans for a warehouse and office building to cost $30,000.

Fire destroyed the ice plant of the Central Illinois Public Service Company, Marion, Ill., with a loss estimated at $100,000.

The Barry Company, Muscatine, Iowa, which has been operating without a charter, has been incorporated with a capital of $500,000. It is preparing to erect a plant for the manufacture of transmission machinery, including pressed steel pulleys and shafting. It is planned to start operations within a few months.

The Fogle Pump & Machine Company, Pueblo, Col., has been incorporated with a capital of $100,000 by J. Leonard Fogle, V. Lloyd Fogle, and others, to manufacture irrigation pumps.

The Western Chemical Mfg. Company, Denver, Col., is erecting a building to replace one which will be removed. Lewis B. Skinner is general superintendent.

E. N. Alme, Grand Forks, N. D., will open a welding plant. He was formerly with the Grand Forks Foundry Company.

The Central Machine Works & Auto Company, Sioux City, Iowa, has been incorporated to take over the business of Morris & Reid, proprietors of the Central Machine Works. It will do a general machine shop and automobile repairing business, and will handle mill supplies, pulleys, belting, etc.

Indianapolis

INDIANAPOLIS, IND., March 22, 1915.

The Frank S. Feeser Company, Indianapolis, has been incorporated with $10,000 capital stock to manufacture automobile accessories. The directors are Frank S., C., and J. C. Feeser.

The Hoosier Stone Products Company, Indianapolis, has been incorporated with $25,000 capital stock to operate quarries, by B H. Hellman, A. M. Bristor and G. P. Steinmetz.

The Electric Service Company, Milltown, Ind., has been incorporated with $5000 capital stock to construct and operate a power plant. D. S. Cook, H. Lemmon and H. S. Gray are the directors.

The Universal Tire Protector Company, Angola, Ind., has sold its rights, franchises, etc., to the Indiana Specialty Mfg. Company.

The Lion Acetylene Gas Light Company, Lyons, Ind., has been incorporated with $10,000 capital stock to manufacture gas generators. The directors are A. G. Kaufman, Walter H. Clayton and Ezra Messick.

John Moerner, Shelbyville, Ind., has bought an abandoned auto factory in that city and will establish in it a bentwood plant and band sawmill.

The R. & R. Mfg. Company, Crawfordsville, Ind., has been incorporated with $26,000 capital stock to manufacture ice skates. The directors are T. W. Conron, F. S. McNeal and G. F. Menig.

The R. & N. Mfg. Company, Crawfordsville, Ind., has been incorporated by A. L. Ringo, A. T. Grady and E. H. Tillson with $100,000 capital stock to manufacture automobile accessories.

The Richland Handle Company, Bloomfield, Ind., has been incorporated with $5000 capital stock to manufacture pick handles. The directors are J. W. Cushman, F. M. Dugger and R. E. Eveleigh.

The Modern Way Furnace Company, Ft. Wayne, Ind., has increased its capital stock from $3000 to $10,000.

The Spencer Table Company, Marion, Ind., has increased its capital stock from $100,000 to $125,000.

The Dixie Fiscal Company, Vincennes, Ind., has been incorporated with $15,000 capital stock to manufacture motor cars. The directors are W. H. McGowen, G. C. Kelch and C. V. McLeland.

An item in *The Iron Age*, issue of March 18, gave the address of the Imbler Fence & Mfg Company, as Anderson, Ind. It should have been given as Alexandria, Ind.

The LaPorte Outing Sulky Company, LaPorte, Ind., has leased the former factory buildings of the LaPorte Radiator Company and will purchase additional machinery, especially power presses.

The LaPorte Radiator Company, LaPorte, Ind., is going out of business.

The Green Mfg. Company, Marion, Ind., will rent a factory and plans to install for most part its own special machinery.

The American Rotary Valve Company, Anderson, Ind., has started work on a new foundry to replace the one recently destroyed by fire.

Milwaukee

MILWAUKEE, WIS., March 22, 1915.

As tool builders make headway in filling export orders, the question of domestic demand becomes one of moment, and while the outlook is considered favorable some apprehension is felt lest operations be materially reduced when foreign buying slackens. In the heavy machinery trade the only booking of note is the contract for pumping engines for the city of Chicago. An absence of important structural specifications is general, although a fair tonnage is expected to mature in Milwaukee soon. Dealers in second-hand or used machinery report an improved demand for light tools from new garages throughout Wisconsin, but beyond this the market is very dull. Miscellaneous municipal requirements in many lines are certain to develop from elections on April 6; but even these propositions show the effect of economy and retrenchment, due to the general cry against constantly increasing taxes.

The Atlas Engineering Company, 784-790 Thirtieth street, Milwaukee, will not move its plant and offices to Manitowoc, Wis., until late this year, because the Manitowoc Citizens' Association was unable to complete the new shop building before March 1. The delay in moving is to avoid interruption in the production during the busiest season in the concrete mixer line. Reports that the removal plan has been dropped are denied at both points.

The Kerner Incinerator Company has been organized at Milwaukee by Frederick L. Sivyer, president of the Northwestern Malleable Iron Company; H. P. Andrae and Theodore Kerner to manufacture a garbage destroying device for residences, hotels, etc. The capital stock is $100,000.

The Oslo Power & Light Company, Oslo, Wis., has increased its capital stock from $5000 to $30,000 for the reconstruction of its hydroelectric plant, damaged by floods last fall. A. O. Anderson is president.

The Wisconsin Machinery Company, Racine, Wis., has been organized with a capital stock of $10,000 to manufacture, rebuild and repair tools, engines and machinery, and conduct a general machine shop. A shop at 1425 Junction avenue has been leased and is now being equipped. Charles Rasmussen is president and superintendent, and R. T. Ingalls secretary and treasurer.

The Metal Window Pane Fastener Company, Sheboygan, Wis., has been organized by William Kueter, H. J. Neuens and August Heider to manufacture a sheet zinc device for securing glass panes in window sills, etc.

The Racine Handy Mfg. Company, Racine, Wis., has been incorporated with a capital stock of $10,000 to manufacture a line of supplies and specialties. H. B. Mansfield, B. C. and C. C. Thronson are the incorporators.

J. Hamacheck & Son, Two Rivers, Wis., operating a machine shop, are ready to proceed with the erection of their new garage and shop, to cost about $7500.

The Badger Crushed Granite Company, Milwaukee, has been organized with a capital stock of $35,000 to develop quarries. The incorporators include M. A. McCabe, J. D. Cantwell and F. I. Weiland.

W. E Thomas, W. A. Heims and A. R. Teske, Merrill, Wis., have organized the Northern Wood Products Company, capitalized at $50,000.

Lone & McCrodan, Lake Geneva, Wis., are about to erect a garage and machine shop, 50 x 100 ft., to be leased to the garage firm of Jensen & Flack.

G. R. Krueger and H. E. Peterson, East Troy, Wis., are about to establish a garage and machine shop under the style of the Auto Inn.

Cincinnati

CINCINNATI, OHIO, March 22, 1915.

Latest available information indicates that the estimate given last week as to the total amount of machine-tool business received by Cincinnati firms since the war in Europe started was not exaggerated. The total figures are now placed above $7,000,000. It is understood that the first order for lathes received from Europe on account of the war demand was booked by the Champion Tool Works Company. This order, which called for a large number of small and medium-sized lathes, was placed early in September, and it was followed by many others to different local machine-tool builders. Before November 15 practically all stocks of lathes and many sizes of milling machines were wiped out. About this time urgent calls were made for skilled labor, but the auto-truck manufacturers, many of whom were also sharing in the war business placed in this country, absorbed a large percentage of the skilled help available in many industrial centers. This added to the skilled labor shortage that in this vicinity has not yet been entirely relieved.

Secretary J. M. Manley, of the National Metal Trades Association, has issued a report for the Cincinnati Branch that shows 90 per cent. of activity for the quarter ending March 15, as against 100 per cent. for the same period ending June 15, 1907, which is taken as a standard. However, it must not be overlooked that during the latter period mentioned all factories were busy, while at the present time only the machine-tool manufacturing members of the association are rushed with work. Many other members, notably makers of engineering specialties and wood-working equipment, who employ a large number of men, have not benefited by the export demand, but, on the other hand, have had their domestic business curtailed to a point where a large number of employees are necessarily laid off. Although the past few days has witnessed some improvement with these manufacturers, it did not arrive in time to influence the percentage of the report mentioned. There was a gain of 18 per cent. over the quarter ending December 15, 1914, which showed only 72 per cent. of activity, and this is attributable entirely to the increased number of men employed by the machine-tool builders.

Quite an improvement is noted lately in the demand from domestic sources for machine tools; but no large lists are out, and only single tools are being bought. It is also rumored that a local manufacturer received last week a very goodly number of orders for wood-working equipment.

Many outside rumors have circulated to the effect that two or three Cincinnati machine-tool builders were making shrapnel cases for a European government. These are incorrect. The report that a large suburban manufacturer in another line has a contract for finishing 400,000 of these shells has some foundation. This will keep this particular plant busy for several weeks, as its domestic business has improved to such an extent that it was enabled to re-employ many workmen who were laid off last December.

Information has been received locally that the Hocking Valley Railroad Company has reopened its car shops at Logan, Ohio. They have been closed for several months. No additional machine tools will be needed just now.

It is rumored that the R. K. LeBlond Machine Tool Company, Cincinnati, will make an addition to its power plant in East End this summer.

Horace W. Jenner, Vincennes, Ind., has announced his intention to locate a factory in Cincinnati for the manufacture of a patented lock nut. He may be addressed in care the Cincinnati chamber of commerce.

The McHugh Express Company, Commerce and Elm streets, Cincinnati, will erect a garage. Very little equipment will be required for the repair shop.

The Leason & Leason Company, Springfield, Ohio, has been incorporated with $10,000 capital stock to market and repair motor vehicles. Ray H. Leason is one of the principal incorporators.

The Victor Rubber Company, Springfield, Ohio, has awarded a contract for a large addition to its plant to F. O. Jones & Co., building contractors, Springfield.

The Cincinnati, Hamilton & Dayton Railroad Company, Carew Building, Cincinnati, has awarded a contract for a 20-stall roundhouse to be constructed at Hamilton, Ohio.

The Sanitary Freezer Mfg. Company, Columbus, Ohio, has been incorporated with $10,000 capital stock, to manufacture an ice-cream freezer. J. H. Noon and J. H. Carpenter are named among the incorporators.

The Medina County Garage Company, Medina, Ohio, has been incorporated with $10,000 capital stock, by A. C. Marsh and others. A small repair shop will be operated in connection with a public garage.

The United Brick Company, Conneaut, Ohio, will increase the capacity of its plant at an early date.

The Belfont Iron Works Company, Ironton, Ohio, has made arrangements for installing special machinery in its plant for the manufacture of woven-wire fence.

Detroit

DETROIT, MICH., March 22, 1915.

The demand for machinery in this section continues very satisfactory; sales of single tools are brisk and some larger requirements have been booked. Much of the increase in activity is attributed to the improvement in the automobile industry. Both manufacturers of pleasure cars and trucks are busy and expect to continue so. A number of manufacturers of automobile accessories and parts are operating their plants on a 24-hr. a day schedule. Conditions in many other lines also are more active. The foundry trade has been picking up somewhat and most plants are better engaged. Power plant and electrical equipment is in good demand. Building conditions show a slight improvement, but the amount of work under way is considerably below normal.

To provide facilities for increasing business the Detroit Pressed Steel Company, Detroit, manufacturer of automobile parts, will add another building to its plant and install additional equipment. C. H. L. Flintermann is general manager.

The Trio Mfg. Company, Detroit, manufacturer of automobile parts and metal stampings, has increased its capital stock from $250,000 to $300,000 to enable it to handle its rapidly increasing business.

The Mack Automatic Heat Register Company, Detroit, has been incorporated with $3000 capital stock to manufacture heat regulators. Philip R. Vernier and Frederick R. Beaubien are the principal stockholders.

The J. C. Goss Company, Detroit, manufacturer of tents and awnings, will shortly occupy a new four-story factory and will install additional equipment.

The Schlieder Mfg. Company, Detroit, manufacturer of poppet valves, has increased its capital stock from $20,000 to $100,000.

The Standard Motor Parts Company, Detroit, manufacturer of automobile parts and accessories, has been incorporated with a capital stock of $300,000. The incorporators are E. J. Dayton, Oscar Gumbinsky and W. S. Grant.

The Superior Box & Novelty Company, Hancock, Mich., has been organized by H. E. Brock, and others, to manufacture boxes, box shooks, etc. Factory quarters have been secured.

The Auto Tire Armor Company, Mt. Clemens, Mich., has been incorporated with $10,000 capital stock to manufacture automobile tires. A factory has been purchased and equipment will be installed at once. Jay Baldwin and A. A. Bennett are the principal stockholders.

Horner Brothers, Eaton Rapids, Mich., have broken ground for a two-story addition to their textile mills.

The Lenmar Mfg. Company, Saginaw, Mich., has been incorporated with a capital stock of $25,000 and will engage in the manufacture of baling machines.

The Hartford Light & Power Company, Hartford, Mich., has been incorporated to take over the electric light plant formerly operated by Anderson Brothers. A number of improvements will be made.

The Pontiac Chassis Company, Pontiac, Mich., has been incorporated with $100,000 capital stock to manufacture automobile chassis. The incorporators are Randall A. Palmer, Detroit, and Edwin P. Waldron and Martin D. Hubbard, Pontiac.

The J. D. Swarthout Company, Saginaw, Mich., has been incorporated with a capital stock of $5000 by Emma C. and Ella M. Graham, Eva M. and Jay D. Swarthout, to manufacture power plant equipment, vacuum steam-heating systems and pumping machinery.

Cleveland

CLEVELAND, OHIO, March 22, 1915.

The domestic demand for machine tools has broadened somewhat. Dealers are getting a fair volume of orders from scattered sources, none of this business being due directly or indirectly to the placing of war orders. Considerable business continues to come from the automobile trade. The increased activity is largely in lathes, but there is an improved demand for other types of machines. In some lines of machinery, particularly those used by the railroads, the improvement is only slight. The domestic demand for turret lathes is rather dull. War orders in the Eastern States have resulted in the placing of some good business in heating furnaces. The foreign demand is holding up well. A Cleveland machinery man who has just returned from a trip abroad says that the foreign demand will continue quite heavy all through the present year, providing the war does not come to an end in the meantime. General conditions in manufacturing plants in the metal-working lines show an improvement.

Corrigan, McKinney & Co., Cleveland, have an inquiry out for five additional cranes for their new steel plant. The inquiries are for two skull-cracker cranes, one of 25 tons and one of 10 tons capacity, a 50-ton power house crane, a 25-ton ladle house crane and a 10-ton cast house crane. While work on the company's steel plant is progressing satisfactorily, it is not expected that it will be ready for operation before early in 1916.

The Monmouth Machine Company, Cleveland, has been incorporated with a capital stock of $10,000 by B. H. Rooke, W. C. Kelley, and others.

The K. & M. Brass & Aluminum Castings Company, Cleveland, has been formed with a capital stock of $10,000 by D. K. Morgan, E. Denner, John C. Barkley, and others, to operate a brass and aluminum foundry.

The Cleveland-Chicago Car Roofing Company, which is erecting a plant in Warren, Ohio, expects to have it ready for operation about May 1. The plant is 170 x 300 ft., with a railroad track running through the center. It has been decided to move the company's Cleveland plant to Warren. The products of the company are steel roofs, reinforced steel ends, car lines, uncoupling levers, etc.

The Doehler Die Castings Company, Toledo, Ohio, is having plans prepared for a factory containing 60,000 sq. ft. of floor space. It will be located at the City boulevard and Lake Shore Railroad.

The Toledo Cooker Company, Toledo, Ohio, will enlarge its plant by the erection of a two-story addition.

The Falls Clutch & Machinery Company, Cuyahoga Falls, Ohio, has been incorporated with a capital stock of $1000 by Charles McCuskey, L. H. Adams, Arthur Higgins, and others.

The Stark Stamping Machine Company, Canton, Ohio, has been incorporated with a capital stock of $40,000 by William C. Seron, Frank A. Wilcox, L. M. Arnold, and others, to manufacture steel and sheet-metal specialties.

The Wyen & Greishop Steel Metal Mfg. Company, New Bremen, Ohio, has been incorporated with a capital stock of $6000 by F. H. Wyen, William Greishop, and others.

Birmingham

BIRMINGHAM, ALA., March 22, 1915.

Machinery dealers report bettered conditions as manifesting a purpose to stay. A disposition is shown to start new enterprises. Money is more plentiful owing to the increased sales of cotton at higher prices and the liquidation of debts. Business is more confident that the worst is over and that the future is safe. Pumps, boilers, engines and gasoline engines are going well, with the volume of business increasing steadily the past few weeks.

George G. Oliver and Algernon W. Nelson, Birmingham, are about to move to Dallas, Texas, where they will manufacture metal culverts for road use.

It is reported that the Cruse-Crawford Mfg. Company, Birmingham will establish a plant for the manufacture of automobile tops and wagon and buggy bodies.

The Southern Furniture Company, Birmingham, has been incorporated by M. M. and Duncan Martin, Memphis, Tenn., and others, with a capital stock of $100,000. It is proposed to establish a furniture factory.

The Crescent Fire Alarm Company, Rome, Ga., has been incorporated with a capital stock of $10,000 by Abner F. Selman, B. S. Harrington and others. It plans to establish a plant for the manufacture of a patented fire alarm device.

The Garolina Lumber Company, Cochrane, Ga., has been incorporated with a capital stock of $32,000 by T. J. and W. H. Battimore, Forts Beam, and others. It will erect a lumber mill.

The Jefferson Electric Company, Jefferson, Ga., will establish a lighting system, developing 60 to 100 hp. W. H. Smith and others are among the stockholders.

A. G. Cobb, Ocala, Fla., and others propose to establish a factory for the manufacture of washboards out of corn cobs.

J. B. Dell, Dothan, Ala., has secured a franchise for an electric lighting plant at Panama City, Fla.

The Crystal Ice Company, Charleston, S. C., will establish an ice plant of 75 tons capacity. L. Henry Descher is president.

The Central South

LOUISVILLE, KY., March 22, 1915.

Increasing retail business is giving manufacturers greater confidence and is backing up the efforts of machinery salesmen. Power equipment has been more active recently and though not yet normal, the boiler trade is improving steadily. Electrical units are selling well, wood-working machinery is in good call, and ice machines, especially of small capacity, have been moving. Contractors' equipment, including gasoline engines, is now beginning to sell, as the construction season here is opening up.

The Norman Lumber Company, Ninth and Magnolia streets, Louisville, is planning to enlarge its wood-working plant. A. E. Norman is president.

The Graf Stove & Range Company, Louisville, plans the erection of a new plant, including a foundry. It has been assembling and finishing for the most part. H. J. Graf, president of the company, has disposed of his interest in the Graf-Webb Iron Mfg. Company, in order to give all his time to the former.

The East End Brick Company, Louisville, has plans for the erection of a brick plant. P. M. Crane is manager.

The Sampson Mfg. Company, Louisville, which makes automobile specialties, plans to increase its capitalization by $100,000 to be used to enlarge its capacity.

Frank Johnson, Georgetown, Ky., is organizing a company with $30,000 capital stock to equip a flour mill.

J. W. and A. Snyder, Hodgenville, Ky., who were recently awarded a contract for the construction of a waterworks plant, will need a 15-hp. engine, deep-well pump, etc.

The West Virginia Stave & Lumber Company, Matoaka, W. Va., will build a stave mill at Whitesburg, Ky. C. W. Hurst will be in charge of machinery purchases.

The Pikeville Supply & Planing Mill Company, Pikeville, Ky., will equip a wood-working plant, and will use special machinery, motor-driven.

J. S. Everett & Co., Maysville, Ky., will erect a grain elevator at a cost of $30,000.

The Clay Light & Ice Company, Clay, Ky., plans to install an additional boiler and generator. C. R. Clark is manager.

The Middlesboro Electrical Works, Middlesboro, Ky., plans to enlarge its machinery business and to carry a larger stock of coal-mining machinery and parts.

New Haven, Ky., is installing a municipal electric light plant.

Harris & Co., Dresden, Tenn., will install power and special machinery for the manufacture of concrete blocks and other cement specialties.

The Clinchfield Portland Cement Company, Kingsport, Tenn., has increased its capitalization from $1,500,000 to $2,000,000, for the purpose of financing improvements in its plant.

The Germantown Grain Company, Germantown, Tenn., will erect an elevator and feed mill with a capacity of 15,000 bu.

Maryville, Tenn., has arranged for a bond issue of $55,000 for the construction of a waterworks plant. R. C. Huston, Memphis, Tenn., is the engineer in charge.

J. H. Watts, Harriman, Tenn., whose cooperage plant was recently burned, has announced that he will rebuild.

A. W. Lucas, W. O. Nelson and W. B. Hillman, Waverly, Tenn., will build a plant for the manufacture of spokes and handles.

Dresden, Tenn., is taking bids on the following equipment for its electric light plant and waterworks: engines, boilers, deep well pump, tank, electric generator, switchboard and accessories. Phil Porter, Clinton, Ky., is the engineer.

A. G. Harrison, Memphis, Tenn., will purchase boiler, engine and other power and special equipment for a steam laundry, now being erected.

Armour & Co., Chicago, are reported to have plans for building an abattoir at Chattanooga, Tenn.

The boiler at the sawmill of Mack Glidewell, Stantonville, Tenn., exploded recently.

St. Louis

ST. LOUIS, MO., March 22, 1915.

Machine-tool business at this point continues rather slow. The domestic demand is very light and this section lacks direct touch with foreign transactions. Export demand has drawn on St. Louis equipment supplies somewhat. Minor equipment, electrical apparatus, etc., has been bought direct for export; but no heavy tools have been drawn from St. Louis except in the indirect way referred to. In a general way the trade here is still reasonably optimistic; but some companies complain that the predicted improvement is slow in arriving. Second-hand tools are in very light request. Collections are fair.

Fire destroyed the crystallizing plant of the Mallinckrodt Chemical Works, St. Louis, together with some equipment. It will be replaced.

C. Charles Mueller, St. Louis, has plans for the establishment of a plant for the manufacture of a patented wall coping of tile.

The Mound City Electric Light & Ice Company, Mound City, Mo., will increase its generating and power equipment, etc.

An electric light and power plant will be equipped at Wheeling, Mo., by E. A. Lowe, Meadville. D. L. Strongquist, Concordia, Kan., is the engineer in charge. Equipment is now being sought.

The Almetal Mfg. Company, Maplewood, Mo., has been incorporated with a capital stock of $16,000 by N. N. Nunn, Leslie P. Huey, and others, and will equip a plant at 7227 Manchester avenue, St. Louis, Mo., for the manufacture of metal washing machines, water motors and electric motors.

The Gat Lin Rotary Tooth Brush Company, Orear-Leslie Building, Kansas City, Mo., has been incorporated with a capital stock of $25,000 by H. W. Gatlin, and others, and will equip a factory for the manufacture of small brushes.

Edina, Mo., will receive bids until April 15 for equipment for a waterworks estimated to cost $20,000. Tuttle & Pike, Kansas City, Mo., are the engineers in charge.

The school board, Kansas City, Mo., of which Charles A. Smith, Finance Building, is architect and engineer, has plans for electric generating equipment for a library.

The Weldon Canning Company, Weldon, Ark., of which J. F. Bell is president, is in the market for power and special equipment.

The Arkansas Light & Power Company, Arkadelphia, Ark., will expend about $20,000 on new equipment for the plant which it has recently acquired at Newport, Ark.

Rison, Ark., has voted the equipment of an electric light and power plant.

Walter F. Arms, Pine Bluff, Ark., has plans for the equipment of a hardwood flooring plant of about 40,000 ft. daily capacity. He represents Los Angeles capitalists.

An electric light plant will be equipped at Yale, Okla., by the Reinhart-Donovan Company, Oklahoma City, Okla. E. A. Pierson is city clerk.

The Eagle Hay Press & Implement Company, Muskogee, Okla., has been incorporated with a capital stock of $175,000 by F. V. Maddin, Tams Bixby and H. H. Ogden, to manufacture farming implements.

A. E. Stephenson, Enid., Okla., will equip a grain elevator to cost about $7500. F. C. Smith is manager.

George F. Dusbabek, Okeene, Okla., will equip an automobile repair plant and garage.

The Perforating Pen Company, Tulsa, Okla., has been incorporated with a capital stock of $10,000 by T. J. Hartman, E. J. Newblock and L. M. Bowman, and will equip a factory.

Wilburton, Okla., will equip a waterworks plant at a cost of about $100,000. The work will be in charge of the Benham Engineering Company, Oklahoma City, Okla.

The Imperial Cotton Oil Company, Macon, Miss., will equip an ice-making plant to cost $20,000.

Cold storage equipment will be installed by Swift & Co., Chicago, in their plant at Meridian, Miss.

The Hinton Brothers Lumber Company, Lumberton, Miss., will replace the mill and equipment destroyed with a loss of $75,000.

G. B. Countiss, Albin, Miss., will equip a plant for the manufacture of handles, clothes pins, etc., and is in the market for wood-working machinery.

The Jackson Veneer & Box Company, West Jackson, Miss., is in the market for equipment for the manufacture of wood toothpicks and similar products.

The sash, door and blind factory of Harry Martinez, New Orleans, La., has been burned with a loss of $40,000. It will be replaced.

Hugh McCloskey, New Orleans, La., president of the American Cities Company, is reported to have plans for the equipment of a large packing plant, etc.

The New Orleans Silica Brick Company, New Orleans, La., of which James H. Dyett is president, will equip a brick plant.

The St. Tammany & New Orleans Ferry Company, New Orleans, La., of which Joseph Birg is president, will equip a power plant.

E. D. Fisher, Morrow, La., will build a moss ginnery, to be operated by gasoline engines. He is in the market for ginning equipment.

The Jitney Automobile Company, 701 Audubon Building, New Orleans, La., will equip a plant for the manufacture of motor cars.

Texas

AUSTIN, TEXAS, March 20, 1915.

Machinery and tools in Texas and the Southwest are in increased demand. An improvement in business conditions generally is noted. Most of the cotton crop in Texas has been marketed and the money obtained from this source is rapidly finding its way into trade channels.

The State Legislature has passed finally a bill which authorizes the incorporation of companies for the manufacture of steel and iron products and of steel and iron structural companies.

It is authoritatively announced that the Texas Midland Railroad Company is considering plans for electrifying its railroad which runs from Paris to Ennis. The building of a central power plant is involved in the scheme. The road is owned by Hetty Green, New York. E. H. R. Green, New York, is president and general manager.

George S. Westerfield, engineer, and Charles T. Boelhauwe, architect, have submitted their recommendations for improvements in the State capitol. They call for an expenditure of approximately $450,000, which the Legislature will be called upon to appropriate.

The chamber of commerce, San Antonio, is promoting the establishment of a vitrified brick and hollow tile plant.

Roy Campbell, San Antonio, plans to build a pre-cooling plant at Mission.

The contract for the construction of a drainage system in District No. 5, Matagorda County, has been let to the Arbin Dredging Company, Houston, for $41,129. George W. Corporon, Bay City, is chairman of the board of commissioners. Dredging machinery will be required.

Edward Kennedy, Houston, and associates, have taken preliminary steps towards constructing an interurban electric railway between Houston and Richmond. The building of a central power station is involved in the plans.

Runge & Co., Cuero, will build a cotton gin at Runge.

The city commission, Mission, has granted a franchise to Hamilton & Horlock, Houston, for the construction of an electric light plant and waterworks system for the town, to cost about $60,000. The same company will erect an ice plant at Mission, to cost about $25,000.

San Francisco

SAN FRANCISCO, CAL., March 16, 1915.

A few weeks of fair weather have brought a gradual resumption of activity through the country, which is reflected to some extent in the machinery trade. Most of the local implement manufacturers are now extremely busy, and orders are coming out more freely for pumps and other hydraulic equipment. Several important irrigation and reclamation projects are expected in the market soon for equipment. Road-building and contractors' machinery is receiving more inquiry and mining machinery is holding up well. Packing-house equipment is in demand. Wood-working machinery remains dull; but the outlook is considered very good. Some merchants report a distinct improvement in demand for machine tools this month, but the gain appears to be limited to small equipment. Few large shops are in the market, and even those that need equipment are disposed to wait. Frequent shipments of gas engines and other machinery of both local and Eastern manufacture are going to Australia and the Orient.

It is reported that the Japanese Government is considering plans for extensive hydroelectric development in Korea, which may result in business in this country.

The American Can Company, 447 West Fourteenth street, New York, is going ahead with arrangements for the enlargement of its San Francisco plant, and it is announced that plans have been completed for a new group of concrete buildings on the tract of land it recently purchased.

L. A. Ellis, Hartford, Conn., and M. Ridler have secured an important interest in the West Coast Gas Engine Company, San Diego, Cal., recently incorporated with a capital of $75,000. The incorporators are L. A. Ellis, Beecher Sterne, one of the former owners, and Stephen Connell. Plans are under way to enlarge the plant.

The Union Oil Company has let contracts for the construction of two oil barges, equipped with gasoline engines, to the Union Iron Works and the Moore & Scott Iron Works, at an aggregate price of $98,000.

The Golden West Motor Company, Sacramento, Cal., is putting in a few new machine tools.

The Southern California Edison Company, Los Angeles, has applied to the State Railroad Commission for authority to sell a bond issue providing for improvements to the amount of about $500,000.

James Madden, Sausalito, Cal., is preparing to build a yacht-building plant.

The Abbott Kinney Company, Venice, Cal., has completed plans for an electric generating plant to cost about $70,000.

Reedley, Cal., is taking bids for a waterworks pumping plant.

The Pacific Northwest

SEATTLE, WASH., March 16, 1915.

The Puget Sound country as an exporter, reached the highest mark in its history when the reports of the customs collector for February disclosed that goods valued at $6,542,865 had been shipped from the ports of Washington. Of this amount, Asiatic Russia received to the value of $1,045,363, raising that country from the lowest place as a customer to the top place, passing even Japan and England, heretofore the largest consumers of Puget Sound merchandise since the customs district was established. This is due to the war, as Russia, aside from the Orient, is the only country offering a port free from marine dangers. It is believed that the current month's trade will show much greater results, as fresh accessions to the line of Russia-bound boats are being made constantly. Of equal interest with the exports statement is the development of trade carried through the Panama Canal, in which a record was also established. Reports show that for February $3,123,253 in goods was shipped by this route.

The State labor commissioner reports that numerous box factories, mills, etc., are re-opening, indicating activity along this line for 1915. Many of the plants are operating at only partial capacity.

General machinery business remains about normal. A number of small orders from the grain sections were placed in Seattle the past week.

The Pacific Tank & Silo Company, Chehalis, Wash., which has been closed down for some time, will resume operations. It will make some improvements to the plant before opening.

Plans for a cement factory for F. B. Waite, Sutherlin, Ore., are being prepared by Earl A. Roberts, architect, Sutherlin. It will be used for a laundry and cold storage plant.

The Star Brick & Tile Company, Mt. Vernon, Wash., will improve and extend its Seattle plant at an approximate cost of $5000.

The shingle mill plant of the W. C. K. Box Company, Orient, Wash., has been taken over by W. W. Shields, Orient. A larger mill will be installed and improvements made to the present plant.

The factory of the Kracht Piano Company, Tacoma, Wash., will be re-opened. Improvements will be made, and new equipment installed.

The Cunningham Mining & Mfg. Company, Ltd., Spokane, has been incorporated with a capital stock of $75,000 by George A. Cunningham, Joseph G. Sells and Smith Hilliard. It plans the erection of a plant for the manufacture of mining equipment.

A flouring mill, with a capacity of 50 bbl. a day, will be erected in Lyle, Wash., by G. H. Stone, Portland, Ore. Plans have been completed and a site secured, and construction work will begin soon.

The Empire Packing Company, Spokane, Wash., will begin work on the erection of a glue factory, hide house, machine shops, etc. The work will be done under supervision of Peter Corneils, superintendent of construction for the Carstens Packing Company, Tacoma. The improvements will cost approximately $100,000.

The City Council, Ellensburg, Wash., has instructed City Engineer Carter to prepare plans for an auxiliary steam plant, estimated to cost $60,000. It will be run in conjunction with the city lighting plant. Bids for machinery will be asked for within 30 days.

Jacoberger & Smith, architects, Portland, Ore., are receiving bids for constructing and equipping the plant of the Coin Machine Mfg. Company, Portland. The factory will be two stories and basement, of brick and mill construction.

The Bellingham Concrete Works, Bellingham, Wash., will install new machinery in its plant. It plans extending its products to include the manufacture of concrete silos.

The Edmonds Company, Klamath Falls, Ore., announces that it will construct a sawmill in the early spring. Some machinery has been purchased and is on the ground.

The sawmill of the Howell-Hill Mill Company, Midland, Wash., was completely destroyed by fire recently, with a loss of $25,000.

Western Canada

WINNIPEG, MAN., March 19, 1915.

Machinery firms say that while there has been no improvement in business the outlook is somewhat better. Machinery for lumber mills has been quieter than other kinds on account of the dullness in the lumber industry. Flour mills have been good purchasers of parts for repairs and additions. It is expected that a good trade will develop in grain elevator machinery this year.

The Manitoba Vinegar Company, Ltd., Winnipeg, is preparing to enlarge its factory. It is announced that 150 generators will be added.

The Western Canada Cordage Company, Ltd., Calgary, Alberta, has been organized to build a twine factory. E. H. Crandell, Calgary, is president.

The Vancouver Shingle Mills, Ltd., Vancouver, B. C., has been incorporated with a capital stock of $10,000.

The Standard Shingle Mills, Ltd., Vancouver, B. C., has been incorporated with a capital stock of $10,000.

The Canada West Electric Company, Regina, Sask., is preparing to erect a factory this year.

Eastern Canada

TORONTO, ONT., March 22, 1915.

The improvement in business conditions is gradually becoming more pronounced. While manufacturing generally has not yet been restored to its normal basis, most of the factories appear to be operating at 50 to 60 per cent. of their capacity. This is much better than was the case a short time ago. Improvement the past week has been quite marked, and several factories are putting on more men. Orders from western Canada are coming forward rather better than was expected; but until the next crop is pretty well assured Eastern manufacturers are not disposed to give much encouragement to orders from the West. Payments from the West, while not good, are ahead of expectations.

Ottawa, Ont., wants prices on alternating current generators, as follows: 200-kw. vertical type, 130 r.p.m., three-phase 60-cycle, 2300-volt; on water wheels, 16-ft. head, 300-hp., 130 r.p.m., and on penstock and power-house pumps. Marchaud & Donnelly, 128½ Spark street, Ottawa, are in charge.

Moore Brothers, King street, Hensall, Ont., propose putting in machinery for the manufacture of pulping knives.

The Montreal Ammunition Company, Ltd., Montreal, has been incorporated by E. E. Howard, J. De Witt and H. C. McNeal with a capital stock of $300,000 to manufacture ammunition.

The water pumping plant and the T. R. Kent Company's drilling plant at the Dominion experimental farm, Fredericton, N. B., have been destroyed by fire with a loss of $80,000.

The Hudson Motor Car Company, Detroit, is to establish a branch in Windsor, Ont., and will probably build a factory.

Bracebridge, Ont., is in the market to purchase steam pumps for the waterworks at an estimated cost of $4000, and proposes to install a motor-driven pump with a capacity of 500 gal. per min.

The Dominion Truck & Transportation Company, Ltd., Toronto, has been incorporated with a capital stock of $1,000,000 to manufacture transportation and weighing devices. J. M. Forgie, H. Riley and R. H. Green are the incorporators.

The Board of Control, Toronto, will receive tenders up to March 30 for the equipment of a machine shop for the Toronto Civic Railway. T. L. Church, mayor, is chairman of the board.

The Axle Valve Company, Ltd., Montreal, has been in-

corporated with a capital stock of $200,000 to manufacture a mechanical device for lubricating axles.

Through the breaking of a fly-wheel the engine in the works of the Beaver Wood Fibre Company, Welland, Ont., was wrecked recently.

An elevator of 1,800,000 bu. capacity is to be erected by the Harbor Commissioners, Montreal, at a cost of about $750,000.

The Sterling Rubber Company, Guelph, Ont., is to erect an addition to its factory.

The cooper shop of T. Delaney & Co., 471 King street, East, Toronto, has been destroyed by fire with a loss of $20,000.

The Canada Universal Nut Lock Company, Toronto, has been incorporated with capital stock of $100,000. The provisional directors are J. M. Robinson, J. Boothe and T. H. Peine.

The sash and door factory of Walter Brown, Beebe, Que., has been destroyed by fire.

The Canadian Pulp Company, Sherbrooke, Que., has been incorporated by William Brown and G. A. MacIver.

Robinson, Ltd., Millerton, N. B., has been incorporated with a capital stock of $199,000 to carry on a general lumber business. James and Weldon Robinson and H. A. Frank are incorporators.

The United Shoe Machinery Company, Ltd., Maisonneuve, Que., has been incorporated with a capital stock of $1,000,000 by E. M. McDougall, W. Knowlton and G. S. Stairs.

The Bell Ice Company, Windsor, Ont., is to erect an artificial ice plant at a cost of $20,000. Fritz Bridges is manager.

A furniture factory is being erected at Welland, Ont., by W. P. Ball.

The Devon Lumber Company, Devon, Ont., is to erect a mill to replace that destroyed by fire.

The Port Dover Planing Mills Company, Port Dover, Ont., is making an addition, 20 x 42 ft., to its plant.

Aube's Automatic Smoke Consumer Company, Ltd., Montreal, has been incorporated with a capital stock of $50,000 by O. Aube, A. Roy and E. Viau.

A company is being formed to take over the idle plant of the Raymond Mfg. Company, Guelph, Ont. The company will manufacture sewing machines. J. G. Sully, Guelph, is in charge.

The drying plant of Albert H. Wagstaff, brick manufacturer, 336 Greenwoods avenue, Toronto, was destroyed by fire March 14. Electrical and other apparatus were destroyed. The loss is $10,000.

The Grand Valley Lumber Company, Ltd., Montreal, has been incorporated with a capital stock of $75,000 by W. R. L. Shanks, F. G. Bush, G. R. Drennan, M. J. O'Brien and H. W. Jackson.

The boiler in the sawmill of C. T. White & Sons, West River, N. B., exploded on March 17.

The Sheet Metal & Tin Works Company, Toronto, has assigned.

The Warwicke Machine Company, Warwicke, Que., has been incorporated. Albert Poisson, Alfred Lachance and Joseph E. Bernier are directors.

The Favary Tire Company, Ltd., Toronto, has been incorporated to manufacture a non-puncturable tire. The capital stock is $500,000 and the directors are James Craig, H. C. Appleton, Walter Page, Jesse Applegath, C. H. Rooke, A. S. Hamilton and A. W. Hunter.

The Metals-Chemicals, Ltd., has been incorporated with a capital of $1,000,000 to take over the smelting and refining plant of Metals-Chemicals Company, Ltd., Welland, Ont. W. Gilchrist, H. Stewart and V. Hughes, Toronto, are the incorporators.

The Standard Valves Company, Ltd., Ottawa, has been incorporated with a capital stock of $50,000 to manufacture heating and cooling apparatus. Hugh Burnet, W. J. Wallace and J. Baird are the incorporators.

The Canadian Consolidated Rubber Company, Berlin, Ont., has completed plans for the enlargement of its plant on Bretthaupt street.

Government Purchases

WASHINGTON, D. C., March 22, 1915.

Bids will be received by the Bureau of Yards and Docks, Navy Department, Washington, until 11 a. m., April 10, for two 2½-ton, three-motor electric traveling cranes, etc., for Newport.

The following bids were opened on March 17 by the general purchasing officer, Panama Canal, Washington, canal circular 891, for material for the pumping plant of drydock No. 1, Balboa terminal:

Item 1, design, fabrication, and delivery on the isthmus of all parts up to the limits defined in the specifications generally; item 2, design of all parts up to limits defined in the specifications generally, fabrication and delivery on the isthmus of all parts except structure up to other limits defined in the specifications; 3, alternate to item 1 for the complete work in accordance with the spirit of the specification with such modifications of methods and details as bidder may desire to offer; item 4, alternate to item 2 for the complete work in accordance with the spirit of the specification and the amount of work to be done under item 2 with such modifications or methods and details as the bidder desires to offer.

Bid 1. Alberger Pump & Condenser Company, item 1, $147,845.

Bid 2. Allis-Chalmers Company, item 4, $179,000.

Bid 3. Hanscom Construction Company, item 1, $153,172; item 2, $143,676.

Bid 4. Charles C. Moore & Co., item 1, $185,000; item 2, $172,000; item 3, $181,539; item 4, $168,539.

Bid. 5. Poole Engineering & Machine Company, item 1, $154,500.

Bid 6. R. D. Wood & Co., item 1, $144,500.

Bid 7. A. S. Cameron Steam Pump Works, item 1, $153,284.

Bid 8. H. R. Worthington, item 1, $140,834; item 2, $129,121.

Customs Decisions

AGRICULTURAL IMPLEMENT CASTINGS

The Board of United States General Appraisers is continuing under the tariff act of 1913 the policy of giving broad interpretations to the agricultural implement provision of the law. This attitude became marked under the act of 1909, and for the most part received the indorsement of the Court of Customs Appeals when issues were taken to that tribunal for review. The latest case involving the section referred to stands in the name of the International Harvester Company, which entered castings of malleable iron, constructed and designed solely for use as parts of agricultural implements. Some of the articles reached this country ready for use, while the others required but minor finishing processes to make them available. The collector at Chicago returned the importations for duty at the rate of 10 per cent. under paragraph 125, which specifies "castings of malleable iron not specially provided for." The importer's claim was for free entry under paragraph 391, as "agricultural implements."

The evidence adduced at the trial of the case proved that all of the articles have been sufficiently advanced by various manufacturing processes to render them absolutely unserviceable for any other purpose or use than as parts of agricultural implements. According to the decision, the representatives of the Department of Justice were unable to contradict this testimony. In finding for the protestant, Judge Fischer lays down some principles of general tariff construction. He says:

> That a tariff provision for "parts" contemplates both finished and unfinished parts is now well settled. As long as it is shown that an imported article has assumed the definite form and shape of a part of another article specifically mentioned in the tariff, and its ultimate use as such a part is clearly and permanently established to the exclusion of any other possible commercial use or fitness therefor, there can be no question concerning its classification as a part of such designated article, provided there is special provision made for such parts.

CHAIN-MAKING MACHINES ARE MACHINE TOOLS

Favorable action was taken by the board on protests by the S. & B. Lederer Company, which imported chain-making machines at Providence, R. I. The articles are described on the invoices as link-forming machines. The customs authorities classified the machines as manufactures of metal, and exacted duty at the rate of 45 per cent. under paragraph 199 of the act of 1909. The testimony, uncontradicted by the Government attorneys at the hearing, was to the effect the machines are operated by other than hand power and are designed to work on metal with the aid of cutting tools. In view of this, the board sustained the claim for duty at 30 per cent. under paragraph 197, as machine tools.

Trade Publications

Tool Holders.—O K Tool Holder Company, Shelton, Conn. Catalogue No. 4. Pertains to a line of lathe, boring mills and planing and shaping machine tool holders and tools in which a series of different tools of the inserted type are used in conjunction with a single holder. Illustrations showing various combinations of tools and holders are presented and photographs and brief descriptions of a number of interesting tests that have been made with these tools are included. Mention is also made of other tools, such as lathe dogs, planing machine bolts, drill holders, chisels, wrenches, etc.

Hydraulic Presses, Pumps and Pipe Bending Machines.—Hydraulic Press Mfg. Company, Mt. Gilead, Ohio. Booklet and bulletin No. 5001. The booklet is a souvenir one that is being distributed from the company's booth at the Panama-Pacific International Exposition. It embodies a short account of the development of the company's business followed by illustrations and concise descriptions of various types of hydraulic presses and pumps. The bulletin calls attention to a 30-ton hydraulic pipe bending machine which can also be used for miscellaneous bending work, such as bending and straightening light axles, small structural shapes, bars, shafts, etc. A brief description with an illustration and a table of specifications is presented and mention is made of the other types of hydraulic presses built. An illustrated description of this pipe bending machine appeared in *The Iron Age,* February 4, 1915.

Metal Stampings.—Gier & Dail Mfg. Company, Lansing, Mich. Collection of photographs. Shows a great variety of metal stampings of all sizes and shapes, together with a number of views of the plant in which they are produced.

Generating Sets With Vertical Engines.—B. F. Sturtevant Company, Hyde Park, Boston, Mass. Bulletin No. 206. Deals with a line of generating sets connected directly to single, simple vertical engines, having either gravity or forced lubrication. The description of the set is supplemented by numerous engravings of the various parts, and lubrication system and repair part diagrams are included. Views of the sets and a table of the principal dimensions are presented.

Metal Hose.—American Metal Hose Company, Waterbury, Conn. Collection of folders. Describe and illustrate various types of flexible metal hose for conveying steam, oil, gas and air or for use as suction and conduit lines. Three forms, interlocking, double groove and single groove, are made, and tables of the various sizes that can be supplied for the several purposes are included.

Air Compressors.—Blaisdell Machinery Company, Bradford, Pa. Catalogue. Contains data on the uses of compressed air for sand blasting, manufacturing textiles, pumping water, hammers, extracting gasoline from natural gas, etc. Instructions on the installation and operation of air compressors are presented, together with a number of tables of useful information, including the air consumption of various industrial tools. Following this, illustrations and descriptions of several types of compressors are presented.

Weldless Wire Chains.—Cleveland Galvanizing Works Company, Cleveland, Ohio. Catalogue No. C-20. Illustrates a line of weldless wire chains and special wire products. The wire products include bolts, rings and hooks of various shapes.

Portable Tiering Machine.—Economy Engineering Company, 415 South Washtenaw avenue, Chicago, Ill. Two pamphlets. The first, No. 16, embodies a number of illustrations of a portable tiering machine in use for handling a great variety of material, with brief specifications of the different machines. The other pamphlet gives a description of the hoisting mechanism used with the machine.

Stoker.—Combustion Engineering Company, 11 Broadway, New York City. Bulletin No. B-2. Calls attention to an underfeed type of stoker, designed for use under all types of stationary boilers and for handling coking or non-coking coal, ranging from 10 to 40 per cent. volatile matter, and 5 to 30 per cent. ash. The construction of the stoker is described at some length, with special emphasis upon the distribution of air and coal with an automatic regulator, the text being supplemented by numerous engravings of the different parts. Instructions on the installation and operation of the stoker are presented, and a number of views of installations are included.

Concrete Pavements.—Sandusky Portland Cement Company, Sandusky, Ohio. Pamphlet. Refers to the use of concrete in the construction of city pavements and country roads. Data on the coast are included, together with specifications for the methods of construction and the various materials employed.

Electric Motor Drive and Brakes.—Electric Controller & Mfg. Company, Cleveland, Ohio. Two bulletins. The first, No. 1039, refers to a reversing motor drive for a planing machine using a direct-current motor. After a brief discussion of the advantages of this method of driving, the control equipment is described at some length with a number of views of the various parts to supplement the text description. Tables of dimensions are included. The other bulletin, No. 1003, which supersedes an earlier one of the same number, illustrates and describes two types of brakes that while designed for cranes and other kinds of hoisting apparatus are widely used in connection with electrically driven machinery of different types. Sectional views with the various parts lettered show their arrangement and dimension tables are included.

Portable Electric Tools.—Chicago Pneumatic Tool Company, Fisher Building, Chicago, Ill. Bulletin No. E-35, superseding No. E-30. Devoted to a line of electric drills which can be operated interchangeably on direct or single-phase alternating current of 60 cycles or less. Six different sizes, having a maximum capacity in metal of holes ranging from 3/16 to 1¼ in. in diameter are illustrated, with brief descriptions and tables of general data.

Upright Drilling Machines.—Henry & Wright Mfg. Company, 760 Windsor street, Hartford, Conn. Pamphlet. Presents illustrations and tables of an extensive line of single and multiple spindle drilling machines. Each class of machine is illustrated with one or more views of the different types, and this is supplemented by brief specification tables of the various sizes. Mention is also made of a sensitive radial drilling machine and a special type of power transmission system.

Power Pumps.—Deming Company, Salem, Ohio. Catalogue J. Describes a line of pumping machinery intended for operation by any source of power, including single and double acting triplex pumps for various services, deep well working heads, artesian well cylinders and rotary and centrifugal pumps. The various types are illustrated and their specifications, sizes, capacities, etc., are given. Attention is called to the Atlas double-acting power piston pump, designed for pneumatic tank service for private water supply systems, for open tank supply and for pumping water for any service where the pressure does not exceed 75 lb. A number of pages are given over to the various types of drive, and several other pages to illustrations of representative installations of the pumps in manufacturing plants, office buildings, for city water supply and in mines and residences. Considerable technical information and tables of data are included.

Boiler Makers' Tools.—J. Faessler Mfg. Company, Moberly, Mo. Catalogue No. 33. Illustrations and descriptive matter explain the construction and use of a line of boiler makers' tools, including roller flue and sectional beading expanders, flue cutters, patch bolt countersinking tools, etc. In each case, in addition to the illustrations of the tools themselves, the various parts are also shown. Diagrams giving the standard dimensions for rivet sets are included.

Oilers.—Maple City Mfg. Company, Monmouth, Ill. Catalogue No. 14. Illustrates and describes an extensive line of oilers of every design, tallow pots, fillers, engineers' sets, torches, etc. Approximately 50 different lines are covered, and a separate page is given to each. At the top an illustration is presented, followed by a brief description and a list of the different sizes that can be supplied. A numerical list, giving the code numbers of the various oilers, together with the principal dimensions and the capacities, is included.

Sprinkler Pumps.—Lucas Pump Company, Dayton, Ohio. Folder. Refers to a line of combination sprinkler outfits, consisting of a triplex pump, air compressor and driving motor, for use in connection with automatic sprinkler systems. Illustrations and descriptions of two general lines are presented, together with tables of specifications.

Hammers.—Chambersburg Engineering Company, Chambersburg, Pa. Catalogue No. 66. Covers a line of single and double frame steam hammers of both the guided ram and guided rod types and steam and board drop hammers. In the case of each hammer, a general description is first presented, followed by specification tables and illustrations of the several sizes. Illustrations are presented of various forgings that have been made with these hammers and mention is also made of automatic lubricators and piston rings. Instructions on the operation and care of the different types of hammers are included.

Drop Forgings.—J. H. Williams & Co., 57 Richards street, Brooklyn, N. Y. Catalogue. Concerned with a line of drop forgings of iron, steel, copper, bronze and aluminum, including wrenches, tool holders, toolpost fittings, lathe dogs, clamps, wire rope, sockets, eyebolts, vises, crankshafts, connecting rods, valve stem rods and levers of several types. All of the various forgings are illustrated with tables of the different sizes in which they can be supplied and the principal dimensions. Mention is made of the special drop forgings that can be supplied and the facilities for making them. Tables giving the approximate weight of the various products, for use in computing freight charges, are included.

Estab

The
tunnel
the Ea
works
Wheeli
requir
semble

sectio
with
weigh
with 7
ing 85
Th
boxes

*Ins
State.